Journal of the Royal Society of Arts

NO. 5044 MARCH 1960 VOL. CVIII

FORTHCOMING MEETINGS

WEDNESDAY, 2ND MARCH, at 2.30 p.m. '*Scientific Methods in the Care of Works of Art*', by F. I. G. Rawlins, C.B.E., M.Sc., F.R.S.E., F.Inst.P., Deputy Keeper and Scientific Adviser, National Gallery. Sir Alec Martin, K.B.E., Chairman of the Trustees, Wallace Collection, in the Chair.

FRIDAY, 11TH MARCH. The Film Evening formerly announced in the separately printed programme has been cancelled. (See Notice on page 163 of the February *Journal*.)

WEDNESDAY, 16TH MARCH, at 2.30 p.m. FERNHURST LECTURE. '*Induced Mutations in Crop Plants—Prospects and Prospectives*', by D. Roy Davies, B.Sc., Ph.D., of Wantage Radiation Laboratory, Atomic Energy Authority. F. R. Horne, C.B.E., M.A., N.D.A., Director, National Institute of Agricultural Botany, Cambridge, in the Chair.

MONDAY, 29TH FEBRUARY, at 6 p.m. The last of three CANTOR LECTURES on '*The Fuel and Power Industries and National Prosperity*', by Albert Parker, C.B.E., D.Sc., F.R.I.C., lately Director of Fuel Research, D.S.I.R.

TUESDAY, 22ND MARCH, at 5.15 p.m. COMMONWEALTH SECTION. '*Changing Patterns of African Land-Use*', by William Allan, C.B.E., M.A., B.Sc., Senior Research Fellow, Department of Social Anthropology and Sociology, University of Manchester. Sir Hilton Poynton, K.C.M.G., Permanent Under-Secretary of State, Colonial Office, in the Chair. (The paper will be illustrated with lantern slides. Tea will be served in the Library from 4.30 p.m.)

WEDNESDAY, 23RD MARCH, at 2.30 p.m. '*Modern Trends in Industrial Design*', by Sir Gordon Russell, C.B.E., M.C., R.D.I., lately Director, Council of Industrial Design. Oswald P. Milne, F.R.I.B.A., J.P., Chairman of Council of the Society, in the Chair. (The second of two papers; the first was read on 9th December.)

WEDNESDAY, 30TH MARCH, at 2.30 p.m. '*The Structure and Organization of the Transport System*', by Gilbert J. Ponsonby, M.A., Reader in Commerce, London School of Economics and Political Science. (See also 4th May.)

WEDNESDAY, 6TH APRIL, at 2.30 p.m. '*The Hovercraft and its Place in the Transport System*', by Christopher S. Cockerell. R. A. Shaw, O.B.E., B.A., A.F.R.Ae.S., Assistant Director, Aircraft Research, Ministry of Aviation, in the Chair.

WEDNESDAY, 27TH APRIL, at 2.30 p.m. PETER LE NEVE FOSTER LECTURE. '*The Life and Work of Daniel Defoe*', by Bonamy Dobrée, O.B.E., M.A., formerly Professor of English Literature, University of Leeds. John Robert Moore, A.M., Ph.D., Professor of English, University of Indiana, in the Chair.

WEDNESDAY, 4TH MAY, at 2.30 p.m. '*Problems, Future Development and Prospects of the Internal System of Transport*', by D. L. Munby, M.A., Reader in Economics and Organization of Transport, Nuffield College, University of Oxford. (See also 30th March.)

Fellows are entitled to attend any of the Society's meetings without tickets (except where otherwise stated), and may also bring two guests. When they cannot accompany their guests, Fellows may give them special passes, books of which can be obtained on application to the Secretary. Official representatives of Companies in association with the Society may also attend with one guest.

THE ALBERT MEDAL

The Council are considering the award of the Albert Medal of the Royal Society of Arts for 1959. They therefore invite Fellows of the Society to forward to the Secretary as soon as possible the names of such men and women of high distinction as they think worthy of this honour. The Medal was struck to reward 'distinguished merit in promoting Arts, Manufactures and Commerce', and has been awarded in previous years as follows:

1864 Sir Rowland Hill
1865 HIS IMPERIAL MAJESTY THE EMPEROR NAPOLEON III
1866 Michael Faraday
1867 Sir W. Fothergill Cooke and Sir Charles Wheatstone
1868 Sir Joseph Whitworth
1869 Baron Justus von Liebig
1870 Vicomte Ferdinand de Lesseps
1871 Sir Henry Cole
1872 Sir Henry Bessemer
1873 Michael Eugène Chevreul
1874 Sir C. W. Siemens
1875 Michel Chevalier
1876 Sir George B. Airy
1877 Jean Baptiste Dumas
1878 Sir Wm. G. (afterwards Lord) Armstrong
1879 Sir William Thompson (afterwards Lord Kelvin)
1880 James Prescott Joule
1881 Professor August Wilhelm Hofmann
1882 Louis Pasteur
1883 Sir Joseph Dalton Hooker
1884 Captain James Buchanan Eads
1885 Sir Henry Doulton
1886 Samuel Cunliffe Lister (afterwards Lord Masham)
1887 HER MAJESTY QUEEN VICTORIA
1888 Professor Hermann Louis Helmholtz
1889 John Percy
1890 Sir William Henry Perkin
1891 Sir Frederick Abel, Bt.
1892 Thomas Alva Edison
1893 Sir John Bennet Lawes, Bt., and Sir Henry Gilbert
1894 Sir Joseph (afterwards Lord) Lister

1895 Sir Isaac Lowthian Bell, Bt.
1896 Professor David Edward Hughes
1897 George James Simons
1898 Professor Robert Wilhelm Bunsen
1899 Sir William Crookes
1900 Henry Wilde
1901 HIS MAJESTY KING EDWARD VII
1902 Professor Alexander Graham Bell
1903 Sir Charles Augustus Hartley
1904 Walter Crane
1905 Lord Rayleigh
1906 Sir Joseph Wilson Swan
1907 The Earl of Cromer
1908 Sir James Dewar
1909 Sir Andrew Noble
1910 Madame Curie
1911 The Honble. Sir Charles Algernon Parsons
1912 Lord Strathcona and Mount Royal
1913 HIS MAJESTY KING GEORGE V
1914 Senatore (afterwards Marchese) Guglielmo Marconi
1915 Sir Joseph John Thomson
1916 Professor Elias Metchnikoff
1917 Orville Wright
1918 Sir Richard Tetley Glazebrook
1919 Sir Oliver Joseph Lodge
1920 Professor Albert Abraham Michelson
1921 Sir J. Ambrose Fleming
1922 Sir Dugald Clerk
1923 Major-General Sir David Bruce and Colonel Sir Ronald Ross
1924 H.R.H. THE PRINCE OF WALES
1925 Lieut.-Colonel Sir David Prain
1926 Professor Paul Sabatier
1927 Sir Aston Webb
1928 Sir Ernest (afterwards Lord) Rutherford
1929 Sir J. Alfred Ewing
1930 Professor Henry E. Armstrong
1931 H.R.H. THE DUKE OF CONNAUGHT AND STRATHEARN
1932 Frank (afterwards Sir Frank) Brangwyn
1933 Sir William Llewellyn
1934 Sir Frederick Gowland Hopkins
1935 Sir Robert A. Hadfield, Bt.
1936 The Earl of Derby
1937 Lord (now Viscount) Nuffield
1938 HER MAJESTY QUEEN MARY
1939 Sir Thomas H. Holland
1940 John A. Milne
1941 President Franklin D. Roosevelt
1942 Field-Marshal J. C. Smuts
1943 Sir John Russell
1944 Sir Henry Tizard
1945 Winston (now Sir Winston) Churchill
1946 Sir Alexander Fleming and Sir Howard Florey
1947 Sir Robert Robinson
1948 Sir William Reid Dick
1949 Sir Giles Gilbert Scott
1950 Sir Edward Appleton
1951 HIS MAJESTY KING GEORGE VI
1952 Sir Frank Whittle
1953 Dr. E. D. (now Lord) Adrian
1954 Sir Ambrose Heal
1955 Dr. Vaughan Williams
1956 Sir Henry Dale
1957 Sir Christopher Hinton
1958 HER MAJESTY QUEEN ELIZABETH II
1959 Vincent Massey

OFFER OF ENDOWED PRIZES, 1960

The Society, as Trustee for the undermentioned endowments, offers the following prizes during the year 1960:

HOWARD PRIZE OF £50 FOR MECHANICAL MOTIVE POWER

The Howard Trust was established in 1868 for the purpose of making awards periodically to the authors of treatises on steam or other motive agents, and a prize of £50 is offered for award to the author of a treatise on some aspect of the subject of motive agents. Works already published are eligible for this award.

FOTHERGILL PRIZE OF £20 FOR FIRE PREVENTION OR FIRE FIGHTING

Under the Fothergill Trust (established by the will of Dr. Fothergill in 1821)

a prize of £20 is offered for a descriptive essay or model embodying some new idea for the prevention or suppression of fire.

Conditions of Entry

(1) Entries for the above prizes must be received by the Secretary of the Royal Society of Arts, 6/8, John Adam Street, Adelphi, London, W.C.2, not later than 31st July, 1960, and must be clearly marked with the entrant's name and address, and the prize for which they are submitted. Essays must be typed.

(2) The Society cannot accommodate bulky apparatus for judging. Entries must be submitted in the form of written descriptions or models, but the Society may subsequently require a demonstration with the actual apparatus.

(3) The Society reserves the right to divide or withhold all or any part of the above prizes, should the quality of the entries justify such a course.

(4) The Society reserves the right to exhibit or publish any entries (the copyright being retained by the competitor).

(5) The Society cannot accept any responsibility for the safety of papers or models submitted to it for the purpose of these awards.

(6) The decision of the Council of the Society regarding all matters connected with the awards will be final, and correspondence cannot be entered into regarding the reasons for any decisions it may take.

The Council wishes to give the widest publicity to these offers and would therefore appreciate any assistance which Fellows may be able to give in making them known. Copies of the particulars for distribution will be sent on request.

NEW HONORARY CORRESPONDING MEMBERS OF THE SOCIETY

The Council has appointed the following to be Honorary Corresponding Members of the Society:

Pakistan: Habib I. Rahimtoola, B.A., LL.B. (Kulib, 59/B, KDA Scheme No. 1, Drigh Road, Karachi).

Alberta, Canada: Charles E. Garnett, M.E.I.C. (20 St. George's Crescent, Edmonton, Alberta).

FIRST BOSTON DINNER OF THE SOCIETY

On Tuesday, 19th January, the Fellows in New England of the Royal Society of Arts gave their first Boston Subscription Dinner. The dinner was held at the Harvard Club of Boston, and was attended by eight Fellows and some eighty guests, for many of whom the occasion provided a first introduction to the Society. Messages of good wishes were received from the Society in London, and from the Honorary Corresponding Members in New York, Washington, Montreal and Ottawa. Mr. G. D'Arcy Edmondson, the British Consul-General in Boston, and a Fellow of the Society, who was in the Chair, shared the head table with Mr. Charles W. Eliot, Professor of Landscape Architecture, Graduate

School of Design, Harvard University. The guest of honour was Mr. Ian Nairn, editor of the *Architectural Review*, London, who spoke on problems of development in the English countryside and their similarity to present difficulties in the United States.

INCOME TAX RELIEF ON ANNUAL SUBSCRIPTIONS

Fellows who have joined the Society during the last year or so may not know that, under certain circumstances, they are able to claim income tax relief on their annual subscriptions. The circumstances and manner in which such a claim can be made are explained in the following letter from the Commissioners of Inland Revenue, which is reprinted from the November, 1958, *Journal*:

INLAND REVENUE

Chief Inspector of Taxes Branch
New Wing, Somerset House,
London, W.C.2.

In any reply please quote:
C.L./SUB/206

8th October, 1958

DEAR SIR,

I have to inform you that the Commissioners of Inland Revenue have approved The Royal Society of Arts for the purposes of Section 16, Finance Act, 1958, and that the whole of the annual subscription paid by a member who qualifies for relief under that Section will be allowable as a deduction from his emoluments assessable to income tax under Schedule E. If any material relevant change in the circumstances of the Society should occur in the future you are requested to notify this office.

I should be glad if you would inform your members as soon as possible of the approval of the Society. The circumstances and manner in which they may make claims to income tax relief are described in the following paragraphs, the substance of which you may care to pass on to your members.

Commencing with the year to 5th April, 1959, a member who is an office holder or employee is entitled to a deduction from the amount of his emoluments assessable to income tax under Schedule E of the whole of his annual subscription to the Society *provided that*—

(*a*) the subscription is defrayed out of the emoluments of the office or employment, and

(*b*) the activities of the Society so far as they are directed to all or any of the following objects—

(i) the advancement or spreading of knowledge (whether generally or among persons belonging to the same or similar professions or occupying the same or similar positions);

(ii) the maintenance or improvement of standards of conduct and competence among the members of any profession;

(iii) the indemnification or protection of members of any profession against claims in respect of liabilities incurred by them in the exercise of their profession;

are relevant to the office or employment, that is to say, the performance of the duties of the office or employment is directly affected by the knowledge concerned or involves the exercise of the profession concerned.

A member of the Society who is entitled to the relief should apply to his tax office as soon as possible after 31st October, 1958, for Form P358 on which to make a claim for adjustment of his pay as you earn coding.

Yours faithfully,

The Secretary,
The Royal Society of Arts.

(Sgd.) T. DUNSMORE,
Senior Principal Inspector of Taxes.

Claims for income tax relief in accordance with the terms of this ruling are, of course, a matter for private negotiations between Fellows and their local tax officers, and it will be appreciated that the Secretary is not able to act as an intermediary in this matter.

NEW LIST OF FELLOWS

A revised List of Fellows, corrected to 1st November, 1959, has now been published and can be obtained by Fellows, free, on application to the Registrar.

ERRATA

On page 106 of the January *Journal*, in the report of the discussion which followed Professor Carter's paper on 'The Present Economic Position of Great Britain', Mr. F. W. McCombie was misreported. The passage beginning 'He mentioned' in line 4 of Mr. McCombie's contribution should read: 'He mentioned that during 1958 and 1959 (the years affected by the famous credit squeeze) our productive resources were not fully employed, and as an economist he tells us *that this was a bad thing. On the other hand, a good many industrialists think* it was a good thing'. (The words in italics were omitted.)

The caption to the illustration on page 219 of the February *Journal* should read 'Bella Coola Mask Dance. *Coast* Salish, British Columbia'.

These errors are regretted.

MEETING OF COUNCIL

A meeting of Council was held on Monday, 8th February. Present: Mr. Oswald P. Milne (in the Chair); Mrs. Mary Adams; Sir Hilary Blood; Sir Alfred Bossom; the Honble. G. E. C. Chubb; Mr. R. E. Dangerfield; Mr. P. A. Le Neve Foster; Mr. Geoffrey de Freitas; Mr. John Gloag; Sir Ernest Goodale; Professor R. Y. Goodden; Dr. Stanley Gooding; Dr. R. W. Holland; Mr. Antony Hopkins; Mr. William Johnstone; Mr. F. A. Mercer; the Earl of Radnor; Mr. Paul Reilly; Mr. A. R. N. Roberts; Sir Philip Southwell; Professor S. Tolansky; Mr. Hugh A. Warren; Sir Griffith Williams and Miss Anna Zinkeisen; with Dr. K. W. Luckhurst (Secretary); Mr. G. E. Mercer (Deputy Secretary) and Mr. J. S. Skidmore (Assistant Secretary).

ELECTIONS

The following candidates were duly elected Fellows of the Society:

Alleway, Albert Ernest, Bedford.
Anderson, John Henry, B.Sc., Stockton-on-Tees, Co. Durham.
Bainbridge, Dennis, Mexborough, Yorks.

Beaubien, Mrs. Jeannine C., Westmount, P.Q., Canada.
Bennett, John Brian, Oxford.
Bonnell, David Glynwyn Robert, M.Sc., Ph.D., Watford, Herts.
Brunner, Christopher Tatham, London.
Buchanan, Professor Robert Ogilvie, M.A., B.Sc.(Econ.), Ph.D., London.
Burnett, Sir David Humphery, Bt., M.B.E., T.D., Oxted, Surrey.
Butler, Miss Barbara, B.A., Enfield, Middx.
Chambliss, John Alexander, LL.B., Lookout Mountain, Tennessee, U.S.A.
Collins, Margaret Jean Faith, Lady, London.
Cox, Ronald James, B.Sc., Watford, Herts.
Garrison, Frederick Charles, A.R.I.C.S., Maidstone, Kent.
Hall, Ruthven Hamilton, A.M.E.I.C., Town of Mount Royal, Quebec, Canada.
Hill, Mrs. Kathleen Thirlwell, Bradford, Yorks.
Holtby, Logan Raymond, N.D.D., L.S.I.A., London.
Joseph, Julius Henry, L.D.S., Penrith, Cumberland.
Keepax, David John, Solihull, War.
Kelly, William, L.D.S., R.F.P.S.(Glas.), Twickenham, Middx.
Kerry, Arthur Michael, Worthing, Sussex.
Lee, Miles Allday, Edinburgh.
Taylor, Frederick Oliver Meddows, Farnham, Surrey.
Morley, Arthur, Stockport, Cheshire.
Myer, Ewart Humphrey, London.
North, The Honble. Charles E., B.Sc.(Eng.), A.C.G.I., A.M.I.Mech.E., Dover, Kent.
Nightingale, Douglas Eric, F.R.I.B.A., London.
Peabody, Miss Amelia, Boston, Mass., U.S.A.
Sargent, Sir John, C.I.E., Hon.D.Litt., London.
Saunders, John Henry, L.R.I.B.A., Southampton, Hants.
Semark, Thomas Cranham, Maidstone, Kent.
Sharpington, William Henry, London.
Tomkinson, Kenneth Ernest, Ayr, Scotland.
Turner, George Edward, B.Sc., M.I.Mech.E., A.M.I.Prod.E., West Hartlepool, Co. Durham.
Wilkins, Keith Matthew, N.D.D., Slough, Bucks.
Wilson, Robert E., Ph.B., B.S., Sc.D., LL.D., Chicago, Illinois, U.S.A.
Woolf, Leonard, Lewes, Sussex.
Wolpe, Berthold, R.D.I., London.

The following Companies were admitted into assocation with the Society:

The Metal Box Company Ltd., London.
Rubery, Owen & Company Ltd., Darlaston, South Staffs.

NEW HONORARY CORRESPONDING MEMBERS

Approval was given to the appointment of two new Honorary Corresponding Members of the Society, in Pakistan and Alberta, Canada, respectively. (See separate Notice on p. 244.)

INDUSTRIAL ART BURSARIES COMPETITION

The recommendations made by the Industrial Art Bursaries Board in respect of the Competition held in 1959 and the arrangements for a competition in 1960 were adopted.

OTHER BUSINESS

A quantity of financial and other business was transacted.

ANIMAL SENSES AND REACTIONS

Two Dr. Mann Juvenile Lectures by

J. D. CARTHY, M.A., Ph.D.,

of Queen Mary College, University of London

I. VISION

30th December, 1959

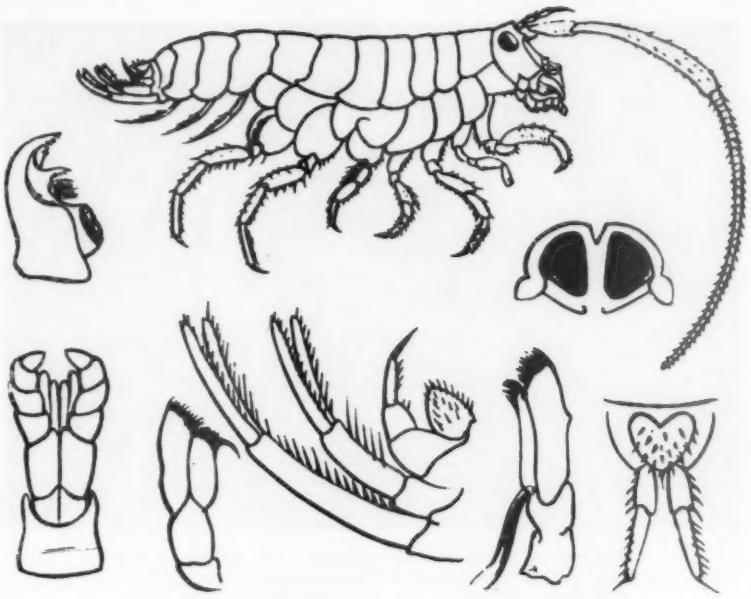
The world we see around us gives us great pleasure, for we enjoy the colours on the feathers of a bird, the shape of a flower or the sweep of the countryside, but it may not have struck you to wonder just what this world means to the animals in it. How much do they see? What things are important to them and perhaps overlooked by ourselves?

When we see a tree, our eyes pick up the rays of light reflected from it. Those rays tell us more than merely the tree's shape, their *wavelengths* are seen by us as colours. And, in addition, we see the tree in three dimensions; it has thickness and is not just a flat shape as if it were cut out of cardboard. We know how near it is to us. All this we know through our eyes, but there are probably few animals capable of seeing as much as we do.

Even to be able to tell darkness from light is important. In nature darkness usually means safety, a hiding place from the predators and, just as important, a place where it is moist, for the possibility of drying-up is one of the hazards of life as a snail or a woodlouse, for example. Fly maggots, feeding on meat, shun the light and burrow deep into their food. If you put fly maggots—which are the 'gentles' you use for bait when you go fishing—on a board and, in the dark, shine a torch along the board, you will see them crawl away down the beam. Point the torch at them from the side and they will turn away from the direction in which they were going so that they still head away from the light.

As the maggots move you will see that they swing their heads from side to side. This is a way of testing whether there is light to the side of them. Their eyes are very simple, consisting only of a few cells in a pocket of the skeleton inside the head. If a maggot is moving away from the light, these cells are shaded by the rest of the body. All is then well, the maggot keeps going in that direction. But when you move the torch to one side, the cells are lit by the torch when the maggot's head swings towards the light. This makes it turn violently in the opposite direction, and swings the whole body over so that it will move away from the light once more.

Many animals, such as caterpillars, lesser water-boatmen and dragonflies, stay the right way up because of their reaction to light. However, instead of moving towards or away from light they move so that the light falls on their backs—the dorsal light reaction, as it is called. As you might expect, animals like the backswimmers (the larger water-boatmen) in ponds, which live upside-



Talitrus saltator, *the sandhopper*. (*From Bate and Westwood's* British Sessile-eyed Crustacea, 1863)

down, turn their undersides to the light. This behaviour is particularly important to caterpillars which are camouflaged in a certain way. If you want to disguise a rod, one way of doing it is to colour the underpart in some light colour, for it is there that the shadow will be cast by light from above. As well, the upper parts, which are brightly lit, can be darkened. The result is that the eye does not pick out the curves of the surface as easily as it would do if the rod were an even colour all over. Some caterpillars are camouflaged in this way. The ones which rest on the top of leaf stalks are light-coloured underneath and dark along their backs. This makes them less easily seen. But if they were to rest with the pale underside to the light they would be obvious. Their behaviour leads them to stay on the top of a stalk so that they are protected by their colouring. Now some species are coloured in the reverse way—light on their backs and dark underneath. They are camouflaged best if they hang beneath a stalk and, needless to say, their reaction is to turn their undersides towards the sky.

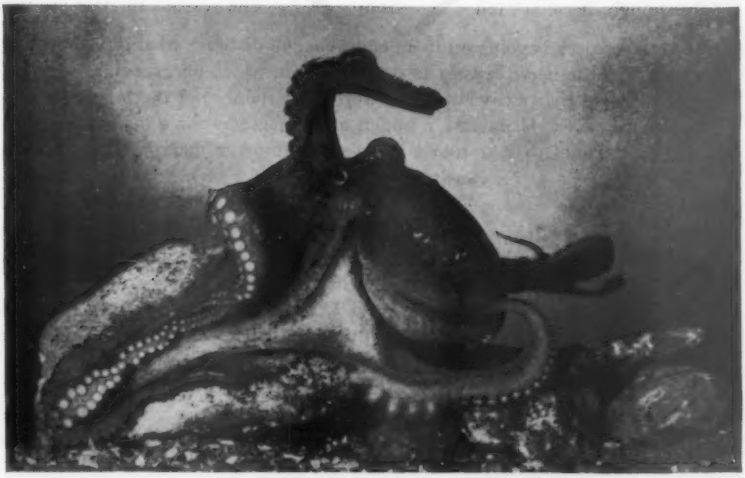
Not so very different from these responses to light are those of other animals which guide themselves by moving along at a definite angle to the sun. A sandhopper (*Talitrus saltator*) will hop and crawl down a sandy beach towards the water if it is disturbed from its burrow in the sand higher up the shore. It seeks

Ammophila pubescens, *the solitary wasp.* (*From Gunter Olberg's* Das Verhalten der Solitären Wespen Mitteleuropas, *Veb Deutscher Verlag der Wissenschaften, Berlin,* 1959)

the moist sand near the sea's edge. The sun acts as its guide for this. The interesting thing is that no matter what the time of day may be, it will still go in the right direction. Now it is plain that, since the sun moves during the day, the animal must be able to alter the angle at which it crawls as the sun's position changes. To do this it has an internal clock like many other animals. By keeping these hoppers in the laboratory lit during the night and in darkness by day, we can put their clocks wrong by just the amount we would expect, for when tested they hop in what is almost the diametrically opposite direction to the correct one.

These are all animals which have used the direction of light to direct their movements. But what of colour? Can animals see it ? It seems improbable that any other animals apart from ourselves and the apes and monkeys, birds, fish and some insects, can see colours. But it is well known that honeybees can recognize colours. We can prove this by giving them sugar water in a dish on a piece of, say, blue paper. Soon they will visit the blue paper in preference to papers of other colours, even if there is no food on it. Most important, we know they are recognizing the colour of the paper, for they ignore grey paper which reflects the same amount of light as the blue. In other words, they can perceive the *wavelength* of the light, they are not reacting merely to the *amount* of light reflected from the paper.

Indeed, we can teach the bees to recognize shapes in place of colours, by



The common octopus. (*From D. P. Wilson's* They Live in the Sea, *Collins, 1947*)

putting down papers with simple shapes drawn on them. But this reveals some strange facts about the bees' vision. They cannot distinguish a round disc from a square, for example, but they have no difficulty in distinguishing either from an open diamond.

Of course, bees recognize the shapes of landmarks which show the way back to their hives. Solitary wasps depend on this means of finding their way also. These insects dig burrows in which they place food—caterpillars, spiders or flies, as the case may be—and then, after laying an egg on the food pile, close the burrow. Once having dug the burrow they must be able to find it again when they return with food. To learn the landmarks immediately around the burrow, they circle above it for about 30 seconds to a minute after they have taken off and before flying off to their hunting grounds. This is sufficient for them to be able to find their burrows quickly when they return. By using imitation landmarks, we can make them fly to the wrong place, if they have seen the landmarks around their burrows on other occasions.

Some unexpected animals can tell one shape from another. You might not expect an octopus to be capable of remembering a simple shape, but it can indeed do so. These relatives of snails, slugs and oysters have a very complicated nervous system in comparison with other molluscs. They can be trained to come out of their lairs to take a crab if it is offered with, say, a shape ▬ but not if the crab is accompanied by ▌, for then the octopus gets a shock.

Oddly enough, it cannot tell from . The reasons for this are not known, but research is going on in an endeavour to discover what it is about the arrangement of the nerve cells in an octopus' brain which permits this.

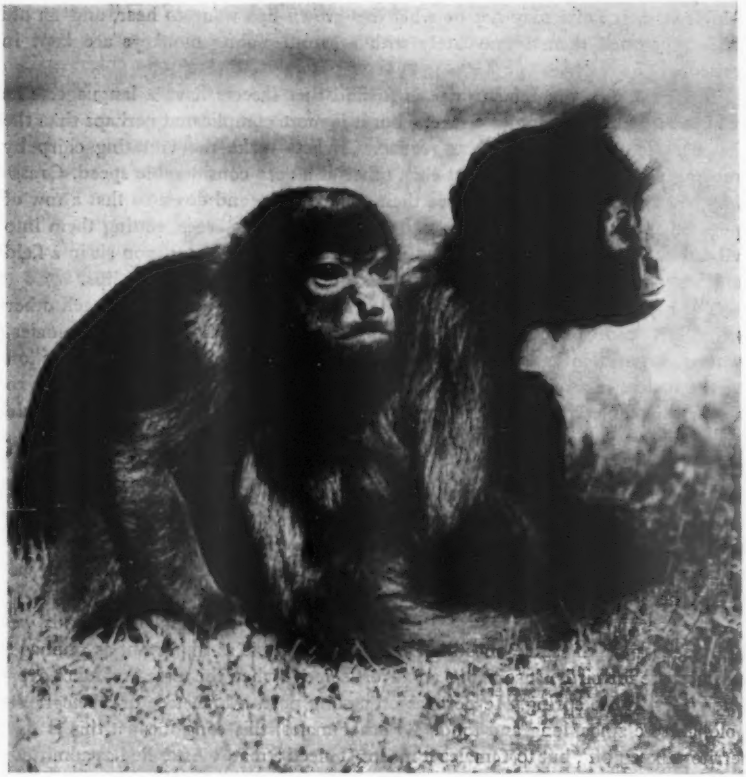
It often proves that our view of the world is certainly not that of an animal. No human being would mistake a bunch of red feathers for a male robin, and yet if such a bunch is put into a robin's territory the male bird owning the territory will attack it vigorously. In the same way a male stickleback attacks a not very fishy shape provided it has the red underside of a male stickleback, and treats a shape which has apparently a swollen abdomen as a female, for the female fish is fat with eggs. A black-headed gull chick trys to obtain food from the most grotesque model of its parent's head, provided it has a narrow 'beak' of the right colour. In fact it will even peck at a 'bill' with no 'head', fixed on the end of a rod and moved slowly in front of the chick. These are abstracts from the wealth of detail we see in the shapes. Yet the ability of animals, such as insects, to learn to recognize shapes is unexpected also. How do nervous systems and eyes of animals work when they react to colour, shapes or merely the direction of light? It is in answering questions like these that zoologists may obtain clues as to the way in which the human brain functions and to the reasons for human behaviour.

II. HEARING

6th January, 1960

Men have admired the singing of birds for hundreds of years. In China a cricket in a beautifully worked cage is a gift of great price, valued for its chirruping song. Once we thought that many animals were silent; we spoke of the silent world beneath the waves; but in fact we know now that at times there is a veritable cacophony of sound to be heard in the sea. Fishes grunt, prawns snap their pincers and a whole range of other sounds are to be heard, made by we do not know whom nor for what purpose.

Most animal noises have a function, they serve some purpose in the life of the animals which make them. During the past thirty years much more has been learned about the language of animals. We would expect monkeys to have a language, and indeed they do. The howler monkeys of the South American jungles have eight main sounds which they use under particular conditions. They move through the tree-tops in clans, rarely coming down to the ground. So many of the sounds indicate the feelings of the monkey which is speaking, and this serves as a warning to the other members of the clan. A disturbance of any sort brings out a low resounding echoing howl; a short bark from a female acts as an immediate warning, throwing the clan into readiness to move away hurriedly. But monkeys are inquisitive creatures and they will investigate unusual objects. If an adult male is slightly worried he gives gurgling grunts,



[C. R. Carpenter

Two young howler monkeys in captivity. (*From J. T. Bonner's* Cells and Societies, *Princeton Univ. Press, 1955*)

but as his apprehension wears off he begins to say 'who-who-who' as his interest grows.

Other calls serve to point the way for the clan. When a male has found the right path through the branches he gives a metallic cluck. This noise also causes monkeys which are feeding to stop and move off through the tree-tops. The youngsters have their own calls, more high-pitched than their parents', just as the chatter of human children is. If, as sometimes happens, a young howler monkey falls to the ground it cries in high-pitched tones which attract its mother's attention. She searches for it, giving wails ending in grunts as she looks. When a young one purrs, its mother cuddles it. And when the young ones play together they make chirping squeals which increase in number and

become more high-pitched as their excitement grows. Again, like human children their noise may not be what the grown-ups want to hear, and an old male can quell them immediately with a grunt. Young monkeys are kept in order!

But perhaps a greater surprise is to find that insects have a language. The Chinese admire the song of crickets, but it is more complicated perhaps than the listeners to their caged insects realize. Crickets make the vibrating chirp by moving their wing cases against each other at a very considerable speed. Grasshoppers, on the other hand, move their hind legs up and down so that a row of pegs on the inner side of them rasp against their wing cases, setting them into vibration. With patience you can attract grasshoppers to you if you sit in a field and imitate their sound by blowing 'purr-purr-purr' through your lips.

The male grasshoppers have one kind of song which they sing to each other and which causes the males to move together into a chirping choir. Females, who are often silent, are attracted by the noise and walk and leap in the direction of the males. If a male sees an approaching female he may change his song to a courtship tune. If this is successful it will lead to mating, and after this the male may make yet another noise. In fact some grasshoppers have an even more elaborate language than this.

The remarkable thing is that some female crickets can be attracted by a great number of sounds, bird call whistles, for example, or even a glass stopper turned in the neck of a glass bottle. The note, that is the *frequency* of the sound waves, does not matter, for the insects perceive a characteristic of the sound which we do not hear but which is quite independent of the frequency.

The hearing of birds, however, is much more like ours, and the sounds we hear seem to be the same ones that birds hear. Song is as important as plumage and posture for birds. It serves as an advertisement when the male first takes over a territory in the spring. He perches on a song post, a high tree or a telegraph pole, and he sings, long and loud. To other males, this song means 'this is my territory, keep off', but to females it means 'I need a mate'. After he has admitted a female to his territory as his mate, other females are not allowed in, though they may be attracted by the song. Another important call is the alarm call, given when danger is near. Sometimes these calls are remarkable, for they warn not only the other birds of the same species as the singer but also birds of other species. They are a universal language among the smaller birds. Also they are pitched at a level which makes it very difficult for larger birds to locate the singing bird. So, sheltered in a bush, the warning can be given without the bird of prey being able to pick off the bird which is giving the alarm.

On the other hand, some of the noises made by birds seem to be for their amusement only, rather like a man whistling under his breath as he mends a motor car. Blackbirds make their sub-song while they are searching for food, interrupting it whenever they take up a beakful. They also sing this song in bushes under cover, quite unlike a blackbird using its advertisement full song. These are only a few of the many different kinds of bird song that can be heard.

Now that they can be faithfully recorded and played back to the birds, we can tell something of their meaning by watching the birds' reactions to our records of their song.

But the noises of animals do not always serve as a means of communicating with their fellows. Bats use noises as a way of finding their way about. The ability of bats to avoid obstacles in the dark is proverbial, and we now know that it depends upon the noises they make. As they fly, insect-eating bats make a twittering noise we can hear, but in addition they utter high-pitched squeaks, so high-pitched that they cannot be heard by most people. These squeaks are bursts of sound often lasting only two or three thousandths of a second. The sound travels out in front of the bat and, if it strikes anything, is reflected back to the bat's ears. This enables it to judge how far away the obstacle is. With ears blocked with cotton wool, bats blunder into things. They locate their insect prey in this way as well. The rate of squeaking goes up as they draw near and the squeaks last an even shorter time than they do when they are just flying along. This makes it possible to sense the position of even smaller objects than before. Notice that they fly for a pebble tossed in the air, believing it to be an insect. Until they are very close or have even grasped it, they cannot distinguish it from something worth eating.

[*H. E. Edgerton*

Myotis lucifugus, *the little brown bat, photographed in flight.* (*From G. M. Allen's* Bats, *Harvard Univ. Press,* 1939)

In South America are found the oil birds or guacháros. These live in the darkest parts of caves, beyond the point where light penetrates. Like bats they can use echo-location, but their noises are audible as sharp clicks among their rasping cries.

Other birds can do this as well. The swiftlets, which make the birds' nests prized for soup, live in caves in North Borneo, again in dark parts, and they find their way by the reflections of their cries from the walls. The remarkable thing is that the caves, as well as being inhabited by thousands of swiftlets, contain thousands of bats. How they all distinguish between their own sounds and those of other bats and birds is a fascinating problem.

Many blind people can use the tapping of a stick or their own footfalls in the same way, sensing buildings and so on by the reflections of the sound from

them. So man out of necessity seems to be able to rediscover a faculty which bats and birds use in their daily life.

Gauchâros. (*From Brehm's* Illustriertes Tierleben, 1891)

THE FUNCTION OF MANAGEMENT IN INDUSTRY AND COMMERCE

A paper by

SIR FREDERIC HOOPER

Managing Director, Schweppes Ltd., read to the Society on Wednesday, 20th January, 1960, with Sir Nutcombe Hume, K.B.E., M.C., Chairman, Charterhouse Investment Group, in the Chair

THE CHAIRMAN: 'The Function of Management in Industry and Commerce' has been a life study of Sir Frederic Hooper and there is every reason for regarding him as a master of his subject. He has had a long and varied career. Beginning as a graduate management trainee, he rose to be the Managing Director of the well-known stores, Lewis Ltd., of Liverpool, Manchester and other centres.

He served in France throughout the First World War, and undertook important Government work during the Second, since when he has continued that service by tackling a job of great importance—the resettlement of senior officers leaving the service. Nobody could have done it better than Sir Frederic.

I do not need to tell you that he is the Managing Director of Schweppes, and in the past long hot summer we all owe to him a personal debt of gratitude. I have travelled the world a good deal and have never failed to get a Schweppes tonic with my gin—that in itself is a tribute to his organizing ability, and his recognition of the importance of the human equation in business success!

The following paper was then read.

THE PAPER

INTRODUCTION

It can surely be no coincidence that the memoirs of Sir Winston Churchill, Field Marshal Montgomery and Lord Woolton—three of our most successful war leaders—all have one emphatic theme in common. This is that the men and women of twentieth-century Great Britain respond best to any situation when they are taken into the confidence of their leaders.

It may seem a far cry from the perilous excitement of war to the sober diligence of business. But the success or failure of our industrial management in peacetime affects the lives of ordinary people almost as much as a spectacular military victory or defeat. Management has become the key activity of any industrial society. Without economic stability there can be no sustained policy either of social reform at home or of effective intervention abroad. The very existence of our Defence Forces depends upon our industrial skill and efficiency. The basic strategies, moreover, of war and industry are fundamentally similar. Each rests on a careful appraisal of the situation, on making a plan of attack by detailed staff work and on precise timing in the use of men and materials. Each, above all, depends on that inspired touch of leadership without which the wheels of industry will always grind uncertainly. Both from East and West we face the

threat of fiercer economic competition. Here, indeed, is a theme to match in intensity the adventure of war. Diplomacy, it has been said, is a continuation of war by other means. So is business: we must export or perish.

I am therefore particularly glad that the Royal Society of Arts should now be turning a searchlight on so vital a function as business management. In the United States we can observe the direct relationship between a high—and rising—standard of living and a high standard of business management. We, too, whatever the size of our businesses, realize that they must be managed by men who are not only honest but also imaginative; not only wise in committee, but also courageous and swift in decision. This intense awareness of the importance of management is fairly recent. Before the war a few works were written, mainly about so-called 'scientific management'. Now there is a flood of books covering every aspect of the subject. Similarly, such meetings as this were very rare before 1939. Hardly a day now passes without some public discussion of the function of management and its wider implications.

We may attribute this quickening of interest in management to four movements in particular. First, the growth of the science of psychology during the present century. Secondly, the application of such knowledge to industrial problems, largely through the pioneer work of such bodies as the National Institute of Industrial Psychology and the old Industrial Health Board now incorporated into the Medical Research Council. Thirdly, the shifting emphasis, accelerated by the experience of two world wars, from the machine to the man: even before 1914 the purely mechanical approach to industry was being rejected on the grounds of inefficiency no less than of social conscience.

Finally, and perhaps most important of all, organized labour has come of age. Since the war it has been able to bargain with management on far more equa terms than ever before. To applaud or deplore this change in the balance of industrial power is irrelevant. But we must not ignore it. For such a movement permeates our economic thought, and is reflected in every facet of the relationship between employers and the employed. Here indeed is one of the great revolutions of our time.

It has come, moreover, at a critical moment in our history. Once more we must sell our goods in a buyers' market. Our competitors include both the Common Market countries, with their newly welded solidarity, and the more distant powers such as Russia, China, Japan and India, the menace of whose industrial development grows daily greater.

Can British management inspire an effort sufficient to meet this economic challenge, a response to which every man gives of his best? Your President, the Duke of Edinburgh, epitomized the task when addressing the National Union of Manufacturers in October, 1953. He said:

> We have now in this country to live by the wit of the scientist and the engineer, who by their inventions start new industries; by the wit of the specialist and the expert, who can improve the methods of production and materials; by the wit of the designer, who can improve the product itself and its saleability. Finally, and probably most important, we must exploit the wit of the manager. He is the co-ordinator who, alone, can bring together and make

use of the ideas of the scientist, specialist, and designer. The manager should be the great brain-picker, constantly on the look-out for new methods and new ideas.

Such are the formidable yet exciting demands which our twentieth-century industrial society imposes upon the managerial class.

WHAT MANAGEMENT MEANS

For the purpose of this paper I use the term management to mean the full-time directors of a business who are in day-to-day control, and those immediately below them who report directly to the board. It is these men who lay down the pattern of the business and set its standards.

It seems to me that they have three main functions:

1. To ensure the optimum use of men, materials and methods.
2. To determine the future of the business in a rapidly changing world.
3. To relate management to the welfare of the country as a whole.

Let us now analyse these three functions in more detail.

FUNCTIONS OF MANAGEMENT

1. *To ensure the optimum use of men, materials and methods*

Management will invariably fail unless it can create conditions for the generation of power and for the control of that power once it has been generated. All power must ultimately depend on a combination of human will towards an agreed objective. Translated into business terms, it demands the ability of management to persuade men that such an objective—the production and sale of goods or services—is both attainable and desirable. Thus even in an age of feverish technological expansion, it is essentially a human problem. That is why Andrew Carnegie used to boast that if he were stripped of all material resources but left with his staff, he would be a millionaire again in five years.

How is the manager to ensure that each individual worker in a business gives of his best? One way, of course, is by issuing abrupt orders from the top, backed by the threat of the sack should these orders not be carried out. Such a practice has only to be stated for its futility to become apparent. Even during the last century it is doubtful whether men gave of their best under the stress of fear. Nowadays, when the balance of power tends to swing away from employers to organized labour, management by imposition can lead only to economic suicide. In its place there must be management by consent. To use the words of Mary Parker Follett, 'power over' must be replaced by 'power with'. In the mid-twentieth century the alternative, in fact, is not between power with and power over, but between power with and no power at all.

No less important in achieving this end is the need for decentralization in all businesses which have outgrown control by one manager—or perhaps one or two members of a family. To neglect the urgency of this operation at the critical moment when such a stage of growth has been reached is a frequent cause of failure in what have seemed to be impregnably prosperous businesses.

The heresy still persists that centralization tends towards economical management: it is a wrong and dangerous belief. In the first place it imposes an intolerable burden on those at the top. They are required by it not only to determine policy—which is their proper function—but also to execute that policy in detail. Secondly, it demands too little of those at the middle and lower managerial levels. Men whose job is merely to transmit orders soon acquire a mental timidity which unfits them for leadership. Finally, a policy of rigid centralization discourages just those qualities of which an expanding business has most need—vigour, imagination and the courage to take calculated risks.

Decentralization, on the other hand, offers the manager corresponding advantages. It draws a clear line between the functions of those who initiate policy and those who put it into practice. It devolves executive responsibility upon subordinate units of management, allowing them scope for imagination and initiative within their own limits. It no less enables top management to concentrate upon the essentials, with minds unfettered by unnecessary detail.

But we must presume that the top manager is not a lazy man. How, then, is he to occupy those hours which real devolution has saved for him? Surely, by bending his mind to fresh problems, often to be found in the field of public service but not directly connected to the day-to-day cares of office or factory. Such mental stimulation, moreover, will almost invariably pay dividends when he returns to conduct the affairs of his business.

A danger, however, lurks in any system of decentralization. The top manager of a business, in his wish for a tidy administrative machine, may sometimes delegate his authority out of existence. One function he must never delegate, however large his organization—the leadership of his labour force. In an age of expanding businesses, the top manager cannot possibly know all his staff: but they should all know him as the man in whom ultimate authority must lie. Men will not give their full loyalty to an abstraction, whether it be the Cabinet, a military staff committee or a board of directors. It is to a Churchill, a Montgomery or a Woolton that they look confidently for leadership.

Through the machinery of joint consultation many firms are now harvesting some of the fruits of decentralization. The joint council is a forum at which every level of the business should be represented, from the factory floor to the board room.

I have already mentioned the steady growth of stature of organized labour. Nearly a century of compulsory education and a widening franchise has brought a new middle class into existence, of whom our factory workers form a great part. They are conscious of their political maturity, of the substantial wages they often command, of the responsibility with which their power must be exercised. To deny them frequent opportunities of expressing their views on matters of intimate concern to them would indeed be folly. Their delegates are in effect the eyes and ears as well as the mouths of the rank and file. They see and hear the problems of modern industry and—no less important—should be trained and equipped to report back to their fellow workers so that their reports

are both understood and believed. Through joint consultation comes co-operation, and through co-operation comes further education.

But joint consultation must never be allowed to deprive management of its responsibility for planning the work of the business. Nor is this a function which the rank and file, or their trade union representatives, are anxious to assume.

Here let me touch on relations between management and the unions. These should never be confined only to moments of crisis. If the executive head of a business is to be recognized by his employees as their leader, he must maintain a close and constant personal link with their representatives. Only in this way can an enduring relationship of confidence exist between the managers and the managed. How many times have union leaders told us privately that if only they had known the facts of a situation in time there need never have been friction!

Another factor which makes for contentment in a business is a clearly marked avenue of promotion for all who are able and willing to follow it. Not everyone will wish to venture up it; but they like to know that it exists and that they have the opportunity of advancement should they wish to pursue it.

An essential duty of management is to impress on the entire business that production is not in itself the be-all and end-all of industry. It is useless to produce goods unless we are able to sell them. Management is not blameless in having so often failed to emphasize this simple fact. Productive efficiency is possible only when production is related to a realistic sales budget. I hope that management will come increasingly to inform all levels and departments of the cost structure of the product; and that those traditional trade unionists who are apt to deride the non-producers will become as sales-conscious as the sales experts themselves.

These, then, are some of the ways in which the manager can ensure the optimum use of men, materials and methods in his business. But in the last resort management is a problem of personality rather than of abstract rules. A manager cannot run a business by relying on a textbook—or even on a paper given to the Royal Society of Arts—any more than a general can lead an army to victory by taking surreptitious peeps into a manual of military training.

In what I am going to say next I shall try to suggest some of the personal qualities which the successful manager ought to possess if he is to win the confidence of those who serve his business.

2. *To determine the future of the business*

(*a*) *Developing people*

No business, however high its standards of efficiency and morale at any given moment, can hope to sustain them unless there is a constant and conscious effort to develop in future managers the qualities of leadership and responsibility.

What are these qualities? First, *personality*—that combination of human virtues and frailties which enables a man to establish contact with groups of widely different social backgrounds and education, without either condescension or obsequiousness.

Secondly, *vitality*—an ability to replenish reserves of energy and ideas from sources outside the office and the factory.

Thirdly, *lively intelligence*, an alert and receptive mind rather than the intellectual apparatus of a research scholar.

Fourthly, an *ability to communicate*—not simply in issuing orders, but in presenting the essential details of a situation in order to secure willing co-operation at all levels.

Fifthly, *judgement*—an amalgam of intelligence and experience which enables a leader to see a problem in perspective, to select what is most relevant to his theme, and so to find the right solution.

It may be said that the man who possesses these five qualities is equipped for leadership not only in business management, but in any other field. This is true. In searching for candidates who will one day hold the top management jobs, we should attach greater weight to qualities of leadership than to specialist qualifications.

The most effective way in which a manager can help his subordinates to develop into leaders is by example. After 40 years in industry, nearly 20 of them as a managing director, I still find it intensely exciting to control and observe this process. The greatest master in this art I have ever known is Lord Woolton. Sometimes I have left his company puzzled, sometimes irritated, but never without being stimulated.

So important is the task of encouraging self-development that it should in any business be the responsibility of top management, not only of a training department. The acquisition of managerial techniques must not, of course, be neglected; but it should not be given pride of place. No manager was ever made merely by sending him on a course. Here let me say a word about management courses. Many, such as Henley, Ashridge, and the University Summer Schools at Oxford, Cambridge and Edinburgh, are making valuable contributions. But even these will give less useful service than they are capable of unless we make sure that the right candidate is sent to them at the right time.

But of far greater use than courses in the development of potential managers—and I make no apology for stressing this point once more—is the attention which top management must give to the problem. First, they must select those who show some sign of leadership qualities, then they must ensure that such candidates acquire the knowledge and experience for the job.

Those chosen for such training must certainly not look forward to a bed of roses. Already they are likely to have spent years in specialized study at school, technical college or university. Internal management training can be no less exacting. The trainee for higher management must learn how to organize work; how to plan finance; to ensure that the right man is given the right job; to maintain good relations with customers, suppliers, other members of the same industry and the general public; above all, how to co-ordinate and control a team of experts within the business—to manage the managers.

This is a formidable syllabus, hardly to be undertaken by the faint-hearted. But I would rather detect too much impetuosity than too much caution in a

candidate. No business can flourish when it is in the hands of those afraid to take risks or unpopular decisions. Here let me quote some words of Sir Winston Churchill: 'Careful planning in every detail; safety first in every calculation; far-seeing provisions for a long-term campaign to meet every conceivable adverse contingency, however admirable in theory, will ruin the enterprise in fact.'

This, in its turn, leads me back to an earlier point—that a highly decentralized business providing opportunities for a man to shoulder responsibility is likely to survive far longer and to flourish more rapidly than a highly centralized organization in which initiative withers and the narrow specialist dares not look beyond his office desk—or maybe his drawing board or his test tubes.

(*b*) *Developing new ideas and markets*

Another objective towards which the manager must perpetually drive is the expansion of his business. National prosperity is the sum total of all such individual efforts, and no manager should fail to imbue his entire business with this sense of urgency. Expansion can be encouraged by the adoption of new products and methods, by research, by advertising, by diversification or by merger. But here I must also add a word of caution. Growth implies change, and change often implies anxiety. It is only natural that the rank and file workers of a business should become unsettled if, for instance, without a word from the management, they hear rumours of some significant change—even that their company is to be taken over. It should be one of the cardinal principles of management that the labour force has the right to be informed at the earliest reasonable moment of all major changes in policy. Behind this lies the difference between treating men as men, and treating them as machines. At its highest, such a principle represents that mutual trust which is the foundation of successful management. Even on the grounds of expediency, it is better that the workers should be given the whole facts of the situation rather than be left to base their judgements on distorted rumours.

(*c*) *Re-appraisal of current products and methods*

No business can determine its future unless it makes a constant and systematic scrutiny of its products and methods in terms of current costs. In this field there is always room for improvement. Sometimes it is revealed in unexpected ways. The greatest saving, for instance, brought about by the installation of electronic equipment may come not from the performance of the equipment itself, but from the elimination of unnecessary procedures revealed by a preliminary survey of the equipment's potential.

Already the post-war emphasis on the value of work study has led to greater economy and improved efficiency in many businesses throughout the country. But I have the impression that there remains an immense amount to be done in the fields of distribution, transport and sales and office procedures. Whether goods are for home consumption or for export, a not inconsiderable part of their cost may well be saved through the application of work study after the goods have been made.

In some industries, it is true, there still lingers the hostility of the unions to such investigation. I hope that the managers of these businesses will regard such a state of mind as a challenge to their powers of winning the workers' confidence rather than as an irremovable obstacle to progress. It is in just these circumstances that their powers of leadership are put to the test.

3. *To relate management to the welfare of the country as a whole*

It will already have emerged, I hope, that the modern manager's horizon should not be bounded by the walls of his office or his factory. However assiduously he attends to his day-to-day administrative duties he will still not be fulfilling his true rôle unless he relates his business to the welfare of the country as a whole. This implies a belief that each business, though a separate entity in itself, is also part of a vast organic community to which it must make its maximum possible contribution. Translated into economic terms, this contribution may take the form of furthering our export drive, a task as urgent and vital as any wartime operation. But it is in a wider sense that I want now to speak of the rôle of management in relation to national problems.

I have always thought that people can best lead full and fruitful lives at one or other of two educational extremes—those of social tutelage and social maturity. The first is when the great majority of a nation remains in the simplicity of uneducated ignorance under the skilled leadership of a cultured and creative minority. The second—and it is a rare state of human felicity—is when the great majority has learnt the art and principles of living.

In this country we have outgrown the first state, but have not yet advanced to the second. Social maturity can no more be taught in the class room than managerial leadership can be learnt on a course: both are the products of experience tempered by a guiding hand. The last theme on which I wish to dwell to-day is that much of the responsibility for exercising such guidance must rest on management.

It seems probable that by the beginning of the next century we shall begin to reap the full harvest of our present technological revolution in the form of much shortened hours of work. At present, however, the working day is for the majority of people in this country their most impressionable social experience—far more enduring than that of schools or churches or political parties or trade unions.

The managements with which people work can condition their whole outlook on life. They have it in their power to unite and to stabilize or, alternatively, to irritate, to antagonize and to frustrate. With the comparatively recent shift in political power from managements to the managed, the social power for good or evil wielded by managers has correspondingly increased. The use of such machinery as joint consultation is the beginning rather than the end of the influence which management can exert.

It is impossible to exaggerate the social effect that may permeate the whole community through the exercise of fair and humane managerial qualities, day

by day and year by day. Can management meet this exciting challenge by leading its workers to the promised land of social maturity?

I hope so. For without a relationship of mutual confidence between managers and the managed there can be little prospect of our enjoying the progressive benefits of technological advances. A working society without leisure leads a bleak life; but a leisured society without the knowledge to enjoy its leisure leads a bleaker.

DISCUSSION

THE CHAIRMAN: An actor told me many years ago that there are two ways of clapping, one with the hands quite flat and the other with them cupped; and when they are cupped it means the audience have really enjoyed the occasion. Your hands were undoubtedly cupped a moment ago.

Sir Frederic made two remarks which in my opinion are the basis of the whole conception of good human relations. He said we should attach greater weight to the qualities of leadership than to specialist qualifications, and he said he hoped that management will come increasingly to inform employers at all levels of matters relating to the business and its progress, so that those who are apt to deride the so-called non-producers will become as sales-conscious as the sales experts themselves. My business in life is to try and make a profit by applying capital to developing enterprise, and in reality we face one main problem—that of picking good management.

I want to begin this discussion by asking Sir Frederic how we should make work-people at all levels what I call profit-conscious? The word 'profit' has come to be slightly derided and the making of profits looked upon as something of which to be ashamed. On the contrary, of course, profit is the basis and mainspring of all industry, because profits can be reapplied to make yet further development and further profit. I am anxious for Sir Frederic to tell me how this vital basic need for profit can be taught, and how the slight disrespect in which the word profit is held can be eliminated in the minds of workers at every level.

THE LECTURER: There is no simple answer to such a difficult question, but the quickest way to bring home the virtues of profit to any bunch of employees is to have a profit-sharing scheme which at least once a year really makes an impact on their pay-packets, and therefore on their minds. It is my own belief that rewards should be in three forms: basic wage, incentive for work on the job, and finally a share of the profits of the business. I think there should be a profit-sharing scheme built into the accounts of the business on a statutory basis, and then there will be no question of arguing about it annually. Otherwise, I think the virtues of profit, and the problems of profit margins on this and that type of goods, can only be put over by careful explanation to the joint council—for they, after all, are the delegates of the workers. We have done this with some little success in some of our factories.

But the most essential thing is for the weekly wage-earner to recognize his own stake in the profit of the business, and he will only do so on the profit-sharing basis. That is really the answer to your question.

MR. T. GRUNDY: Sir Frederic said that the top man should stimulate and enthuse. I have found from my experience that it is essential to have a chairman or a manager who has those particular qualities. Another point made was that the management should keep their employees in the picture the whole time. I am quite sure that if management would notify its employees of any major changes we should not have so many of these wildcat strikes. In my own organization we have carried out Sir

Frederic's suggestion of profit-sharing schemes, and we have found that people do tend to watch and spot waste because they appreciate and understand the scheme.

MR. A. POWIS BALE: I have been surprised by recent happenings in the working world, and particularly by this strike which appears to have begun as a result of the foreman using strong language. Could Sir Frederic give us his view on this?

THE LECTURER: On the face of it, I should think that a strike of that nature does suggest a wrong atmosphere within the whole business, and one which probably has a deep-seated reason, probably dating far back. In my experience that sort of strike does not happen, provided the atmosphere of the business is right. But when you have a situation in which the people are disgruntled, any little thing, it does not matter what it is, will set it off. I do not think, in other words, that we ought to question the official reason for these strikes at all. They would not happen if the underlying atmosphere of the business were right, of that I am quite sure.

DR. G. S. HISLOP: I am an engineer and a director of a company. Sir Frederic gave advice that the management should let their work-people know when changes are pending affecting the firm, especially involving take-overs and the like, where rumours provide grounds for uneasiness and distortion. However, this advice seems at variance with advice given by the City on the question of the ethics in the situation of a take-over, where everything possible must be done to keep the whole business secret until the respective Boards are agreed. I should like Sir Frederick to say something about the reconciliation of these two apparently conflicting views.

THE LECTURER: I am glad you have raised that question, because I entirely agree with the recommendations made by that Committee (and by other committees which are now sitting), that secrecy in the initial stages is absolutely essential. On the other hand, employees should not read about these proposals first of all in their daily newspaper. There comes a point at which the thing is about to be published and is agreed by both sides, and even if it is only a question of sending a wire at four o'clock in the afternoon—'You will read it in your newspaper tomorrow, but we want to advise you beforehand'—it is worth doing. It is just to make the people feel that at least they are taken into the confidence of their own management before the general public. But clearly when negotiations of a highly confidential nature are proceeding, they cannot be divulged; otherwise you can get all sorts of gambling on the Stock Exchange.

MR. N. S. FARROW: I was rather interested to hear the definition which Sir Frederic gave of management, and I imagine it was given in the context of management by full-time directors, and management by those below, who report to the Board. I wonder if he could possibly expand that definition a little, because my definition of management goes very much lower than that.

Sir Frederic listed the qualities he expected his future managers to have, personality, vitality, intelligence, ability to communicate and judgement. One is obviously looking for people of such calibre, but how often does one find somebody promising, who is shaping well in one organization, but who yet decides to leave it and go elsewhere. Is there anything one can do to try and stop the wastage of promising young people like that?

THE LECTURER: The answer to your first question is that my definition of management was in the context of this paper; in other words in the context of top management, of those whose chief job is to manage the managers. Obviously management can also be regarded from the top and middle, and indeed from the junior's point of view, but in my terms it was top management only.

With regard to this question of the qualities I think ought to be possessed by top

management: of course, you can add a number of others. I have changed my own list from time to time, but those I gave are the outstanding ones. How are you going to prevent people at the junior levels who may have some or all of those qualities from becoming disgruntled and going elsewhere? Obviously you cannot, if you cannot provide sufficient opportunity for them. I do not think that is a bad thing. I personally should feel disappointed if a large number of managers in my own business suddenly decided they wanted to go elsewhere. But if one or two do so and are snapped up by other businesses I do not mind, particularly as they sometimes come back in a year or two and ask if they can have their old jobs again—and that is good for the ones who stay!

Underlying your question is the belief that there must be an expansionist atmosphere in the business for people with the sort of qualifications I have described to be chosen for promotion. In other words, they should be able to see a future before them in your business and you should take the necessary steps to develop those qualities because all of them require special types of development. You cannot exercise judgement unless you have responsibility. The possession of mental and physical vitality must have some exercise outside the bounds of your own business. Personality requires that the nucleus of the person should be there, but the modern technique of personalization is a highly technical and experienced thing of which a man must have some experience. You must give him a chance to gain that experience. If he possesses these qualities he has got to see for himself that yours is the sort of business in which he can eventually use them; that the business recognizes those qualities and will give him a chance to develop them.

MR. ARTHUR PRIESTLEY: Sir Frederic has spoken of the need for work-people to be informed of any decisions, about changes in policy, and so on. How does he suggest they should be informed: by delegation, by direct word of mouth, or by notice board?

THE LECTURER: A notice board is pretty hopeless for this purpose. When a thing goes up on the notice board you don't really communicate it to members, because we all know that only one out of a hundred will ever look at it. If the matter is really important—such as a change in policy that is going to involve some change in their personal work—then I am quite sure that the only way is by word of mouth. To do it through joint councils or delegates is all very well, but I am sure everyone in this room knows the difficulty of training delegates to report back to the mass of workers, even if the mass of workers want to know. In my experience, if you have an important communication to make, the only way is for a person of some seniority to make it in person. I was trained by Lord Woolton to go round myself when something really important occurs, and I still do: I speak to mass meetings at the larger factories. The grape-vine works well, but I make sure that the main body hear it from me.

MR. WARREN LAMB: One would assume from Sir Frederic's analysis that the manager would be able to manage in all sorts of conditions. Is there a constant basis of management? To manage, say, a fleet of trawlers is rather different from managing a confectioner's business, where mainly women are employed. Is there a constant basis, or will there be cases of a man who might manage under one set of conditions but not under another?

THE LECTURER: I am sure that there is a constant basis, whether the business is a coal mine, or a sweet shop, or a fleet of trawlers, or even an army. In terms of top leadership what counts is, I am sure, the spirit and technique of personalization whereby the leader is able to command respect and confidence throughout the unit, and has the ability to choose the right people and to delegate to them the necessary expert authority which the particular operation requires, but which the top man himself does not necessarily need to have.

MR. GEOFFREY DE FREITAS, M.P.: Could Sir Frederic define profit in such a way as to cover what happens, say, in Russian industry? In the next few years we are likely to see a very great increase in the Russian wealth, which will call in question the very basis of the first question the Chairman put, about the necessity of profit as an incentive in our industries.

THE LECTURER: I think there is only a difference of nomenclature. In Russia I am sure they call it a surplus and here we call it a profit! In other words, there is an amount by which the revenue exceeds the expenditure; if there is not, somebody has got to pay. In the case of Russia the community as a whole has got to pay, but here in due time a business without profit would go bust, and the shareholders would pay.

The suggestion that the purpose of the business is to make the maximum profit in terms of individual transactions is entirely foreign to me. Perhaps the dangerous situation we are going through now is the spill-over from the war, when unfortunately it was too easy to make inordinate profits. That was a dangerous situation and did a great deal of harm to competitive private enterprise, which in fact did not then exist. But now we are back in proper competitive private enterprise the surplus should be only sufficient to justify a continuance of the business. Some of this surplus will go to the benefit of the shareholders. A great deal if it also goes towards the continuance of the business in terms of reserves, etc., which in turn enable the business to expand, to provide greater opportunity for the employees and constantly improving terms and conditions of employment.

MR. J. P. WALMSLEY (Student at the College of Estate Management): Service officers are used to managing men who cannot answer back. Will they ever be able to make capable managers in industry?

THE LECTURER: That is the old idea of officers, that they exercise their managerial quality purely because they are backed by the Army Act, and soldiers have got to do as they are told. I honestly do not believe that is now so, and I do not think that any efficient organization could ever work on that basis. I have had some experience in the last three years of seeing officers of all ages, ranks and types coming out of the services and going into industry, and that problem has not in practice worked out as a problem at all. Able officers have not found it in any way difficult to get middle management positions or in some cases senior management positions, and they have not found it at all difficult to get what they want done, because in the services now they are trained to obtain the necessary appropriate action by explaining why it should happen, and not because it has damn well got to be done.

MR. W. J. DAVIES (Taylor Woodrow Services Ltd.): I hold the view that you can train managers but you cannot teach management, because much of management is learnt by managing. I ask Sir Frederic's views on this.

THE LECTURER: Yes, broadly, I am in agreement with you. I am sure you cannot train managers or run a business by looking at a text-book on management, just as you cannot run a war by looking at the manual of training. But at the same time it would be a pity if it was thought that those preparatory adjuncts to management were not important. I am sure they are, against the background of experience, both in management and experience of leadership and in development of personality. I think it is important to have a course the nature of which we know about, and in which men get an opportunity of talking with each other as well as of hearing from those who manage, how they act. The advantage is that you are taken off active responsibility for a time, and encouraged to think, which cannot fail to be a good thing.

MR. H. WILMOT: First of all, Mr. Chairman, I should like to add to what others have said in congratulating Sir Frederic and the Society on this remarkably able and provocative statement of his.

My questions are prompted by considerable experience of different levels of management in industry—industrial factories—I am not talking about commerce or running fleets of trawlers. My opinion is—and I challenge Sir Frederic on this—that joint production councils and the like, where men appoint delegates to sit round a table with management, are not really so effective as a conception of management that goes right down to the foreman and even to the chargehand, so that each individual is himself in touch with management. I have never had a strike in any of my factories in thirty-five years, which I think is a fairly good indication that relationships are happy; and I believe that is entirely due to one rule which I have insisted on for long, that a complaint made by any man to his chargehand or to his foreman or to the departmental manager (and it has got to go through the prescribed channels) must, if not settled lower down, reach the chief executive's office; and, if it is still unresolved, a telegram must reach my desk in London within forty-eight hours of the man's first making the complaint. It is not the subject of the complaint that is important, it is the fact that management thinks that *time* is important, and that it can be settled quickly, whatever it is. I believe that as with a forest fire, you can stamp out discontent and complaints if you attend to them quickly, and I think that such intimate contact of the individual workman with an individual chargehand or foreman, and having that direct link to my desk in London by telegram, is the most vital factor of all in keeping a high morale in the factories.

The second problem I should like to ask Sir Frederic about is one that has troubled me a lot, and one to which I have never been able to find an answer. It is, whether you should encourage subsidiary companies, instead of departmentalizing; whether you should legalize subsidiary units for the sole purpose of giving junior executives junior directorships; at what age you should do this, and at what age you should limit a man from coming on to your senior boards. Should there be a limit at the junior end, should there be a limit at the senior end, and if so why?

THE LECTURER: Mr. Wilmot's first question was delivered as a challenge. I enjoyed that, but I do not think it will work out as one, because we are talking about two different things.

I agree with him that joint councils should have nothing whatever to do with the handling of disaffection which might lead to strikes and so forth, and I was delighted to hear that he adopts exactly the same practice as I do. Nobody in the whole of our organization except the managing director, has any right to dismiss anybody. If a question of disciplinary action arises, it has to be submitted to him personally, and at once. If it looks like a strike, obviously I am in the middle of it. If things are handled sufficiently quickly, it produces an atmosphere which does not encourage disaffection. But joint councils—joint councils which raise all aspects of the business, particularly the sales side—should be a means by which you communicate to the ranks of the labour force what is going on in the business—not the troubles and rows. I know that, very largely, the idea does not always work. But at least I have found after nearly forty years of experience that while it may not work in the sense of being an entirely satisfactory means of communication, nonetheless people feel that you are taking the trouble to try to let them know, and that is half the battle I am quite sure.

In other words, I agree that many joint councils as now set up do not look to be doing anything like the job they might be doing, but the fact that there is a properly elected, representative employees' council is a stabilizing agent in the total atmosphere of the factory.

Now with regard to this question of subsidiary companies and setting up boards,

it is a fascinating subject to which I do not pretend to know the answer any more than you do. I think it is bound up with the extent to which you are prepared to centralize authority. In other words, if you really are prepared to decentralize really important day-to-day authority over a sufficiently large unit, it is a good thing to create a separate company with its own board. In our own company, we have a central board and five other boards. Three of them are reasonably large, and the average age of those on the boards of subsidiary companies (not counting the ones we have recently merged, on which they tend to be rather older) is at the most 42 or 43. I think it is an advantage that the people from whom you are going to choose your central directors should have some earlier experience of how a board operates, because in any business, the view from the top looking down is so different from the view from the bottom looking up, as we all know.

MR. G. VIVIAN DAVIES: There is in my opinion too much emphasis on youth to-day, particularly in the Press, and industry seems unwilling to consider people over forty years of age as applicants for positions. Does Sir Frederic consider that management is relying too much on youth and not enough on experience? The experience of older men surely makes up for their lack of youth, and should not be lost to industry.

THE LECTURER: Yes, I have thought all along, ever since I grew older myself, that too much importance is being placed on youth! That feeling is being strengthened daily. The recent experience I have had of resettlement has greatly buttressed my views about this. If you have got a good man—and that is the basic premise—who has had the sort of experience and training which can be applied without a major change to a wide range of jobs, the basic qualities of management that we talked about earlier—then 40, 45, even 50 is not too old, providing there is a place in the age structure of the business. But, you see, sometimes the reason why people over 40 and near 50 are looking for jobs is frankly because they have failed rather badly when young and in middle age, and so are looking for the better jobs which they feel they should have got. For such as those—well, I hope they will be fortunate, but obviously each case has got to be decided on its merits. But in terms of age alone, it is in my view quite ridiculous to talk about a man being too old at 40.

MR. E. SEYMOUR-SEMPER: May I return to this question of profit-sharing schemes? It has been, I think quite rightly, said by Sir Frederic that a profit-sharing scheme does make work-people profit conscious; and an equally beneficial effect, in my opinion, is that it makes them feel they are partners in industry, and that surely should be our objective. Where the schemes I know seem to me to fall down is that they are too remote and too indirect. The working man looks for something which is of value to him week by week; anything which comes in the form of a dividend or profit-sharing year by year is too remote. He feels that, being only one member in a large organization, anything he can contribute towards efficiency will have little or no effect on the ultimate profit, and it is not sufficiently direct in my opinion for him to be greatly influenced by it. I should like to ask Sir Frederic whether he knows of any profit-sharing scheme which avoids what seems to me to be a great disability of the schemes running at present.

THE LECTURER: I think you are talking of the old-fashioned working man—he is rapidly disappearing. I believe that the working man who now constitutes the new middle class, though he still recognizes that he must have his direct weekly wage, plus a weekly or monthly incentive bonus or whatever it may be, is also very much alive to the advantage of a yearly profit share provided, and I made the point originally, it puts something worth while into his pocket. For example, in our own scheme for the older and long service men, the share went up by a very substantial amount, and I think that even a recently joined adult male employee who had put in a full year got

nearly £50 in his first year. That is the sort of figure which I think is worth while, with a rising figure as his service goes on. When figures of that order are involved, the profit-sharing panel, formed from amongst the joint council delegates themselves, comes and discusses with our auditors how it should be distributed. I am not present. If that sort of action is taken and well presented within a company, I should be very surprised if all the solid elements in the labour force do not fully recognize its advantage.

There may be a little trouble with temporary people, but all our employees retained after the first three months are considered to be established staff and come into this scheme. I am sure that the solid core on which the atmosphere of any business depends can easily be made fully conscious of the virtues of a scheme which produces potential and real benefit for them.

THE CHAIRMAN: I have the pleasant task of proposing a vote of thanks to our speaker, not only for what he has said but for the inspiring way in which he said it, and for the patience and skill with which he has answered your questions. The second half of our meeting was every bit as beneficial as the first. I have never heard questions more ably answered.

The vote of thanks to the Lecturer was carried with acclamation and, another having been accorded to the Chairman upon the proposal of Mr. G. E. C. Chubb, the meeting then ended.

THE PRESERVATION OF GAME IN EAST AFRICA

A paper by

R. L. E. DRESCHFIELD, C.M.G., Q.C.,

Chairman, Uganda National Parks Trustees, read to the Commonwealth Section of the Society on Thursday, 14th January, 1960, with Peter Scott, C.B.E., D.S.C., in the Chair

THE CHAIRMAN: It gives me special pleasure to take the Chair at this meeting, because though I have frequently been in this room before at meetings of various kinds, this is the first time I have appeared under the auspices of the Royal Society of Arts itself.

I should like to say a word or two about conservation because it is a subject which is very close to my heart, and it is interesting because it is a comparatively new conception. The idea that man has a moral responsibility in the field of conservation, and really ought to feel shame for the fate of the dodo and the passenger pigeon and such—this is a comparatively new one in our civilization, and a very important one. For example, the largest animal in the world (probably, too, the largest animal that there has ever been in the world) is at this moment in the gravest danger of extermination—the blue whale.

I think the reason why I have been invited to take the Chair originates a few years ago with an invitation which I received from Mr. Dreschfield to go to East Africa to open the Safari Lodge in one of the two beautiful parks in Uganda. I was then able to spend only a short fortnight visiting these wonderful parks, going first of all to the Murchison Falls Park and then to the Queen Elizabeth Park. When Ralph Dreschfield came back to this country I was anxious to offer some return hospitality, and we did manage to show him a few ducks down in Gloucestershire and—perhaps more important—we took him gliding. Anyway, there is no question that Ralph Dreschfield, as Attorney-General for Uganda and as Chairman of the Trustees of the Uganda National Parks, is supremely well qualified to talk on the subject before us.

The following paper was then read.

THE PAPER

Before reading my paper I feel I must express my appreciation and gratitude to Peter Scott for agreeing to act as Chairman at this meeting. No person has done more for the preservation of game throughout the world than Peter Scott, and I can imagine nobody whom I would rather have as Chairman. I should also like to take this opportunity to thank Mr. Bayard Read for allowing his film to be shown to-day; I have no doubt that you will agree with me as to its excellence after you have seen it. Finally I should like to thank the Royal Society of Arts for giving me this opportunity to address you.

Just before I left East Africa I received a report that a number of poachers had been caught in one of our National Parks drying buffalo meat from the

carcasses of buffalo which had been snared by them within the park. At the same time I received a report that a wounded elephant had seriously injured a ranger in the other of our parks, and that this elephant had been wounded when raiding the food crops of an African living on the borders of the park. The reports of these incidents reminded me that when I was last in England, there was a tremendous outcry where I was living because a maiden lady with a large garden was allowing a family of foxes to grow up in that garden, and the vixen (I am not referring to the lady), was nightly raiding nearby chicken runs. This lady was doubly unpopular because she habitually removed snares and traps laid by local farmers for rabbits when she walked through the countryside.

Incidents similar to the two African incidents are parts of the day-to-day life of those concerned in the preservation of game in East Africa—bear them in mind, as you will find them relevant to nearly all I am going to say to-day.

You may well ask why I should mention an incident that happened in an English village. The reason is because, although conditions in Britain appear on the surface to be different from conditions in Africa, the problems are basically the same. Just as the British smallholder wishes his smallholding to be protected from foxes, so the African smallholder wishes his crops to be protected from elephants. Likewise, just as many British farmers can see no reason why they should not use cruel traps to catch rabbits, so many African peasants see no reason why they should not use similar traps to catch the wild game of their country.

The similarity does not end there. Frequently when measures are introduced in Britain to preserve the countryside, or to preserve its flora and fauna, the strongest opposition is met with from dwellers in that very countryside. So, when attempts are made to preserve the flora and fauna of Africa, large numbers of Africans oppose the measures. My illustration, therefore, demonstrates how ill it behoves the people of Britain, or for that matter, the people of Europe or America, to adopt a 'holier-than-thou' attitude when discussing or recommending measures to preserve game in Africa. I say this because I am afraid it is not uncommon for people outside Africa to preach to the Africans, and to those of us who are working with Africans, without considering whether they are in a position to preach. It must be remembered that the game laws of England, until very recently, were framed not for the purpose of preserving game, but for the purpose of allowing only the privileged few to hunt that game. The basic reason there is any game left in Britain is not because the British have in the past displayed any particular affection for birds and animals; it was, and to a large extent still is, because of the British love of hunting. The majority of those who shout loudest against blood sports, so called, shout not at the destruction of the animals, but at the manner of their destruction. Please do not take offence at what I am saying, as I realize that there are many people in Britain with a genuine love of wild life, and I believe that that number is growing daily thanks, very largely, to the efforts of our Chairman and other enthusiasts.

You may well ask, 'Why should anybody in Britain wish game preserved in

Africa? In any case, what business is it of the British? And what is the purpose of game preservation?' My answer is simply, 'Would any of you wish to see the Yorkshire Moors, Runnymede, or the Highlands of Scotland destroyed?' Such places, for some indefinable reason which only Shakespeare was capable of expressing, are the heritage of the peoples of Britain. So, likewise, are the flora and fauna and the great scenery of the African continent, the heritage of the peoples of Africa. At the moment this heritage is only seen by these peoples as if through a glass darkly, but we, who have seen so much destruction of our own heritage, can see the danger more clearly. While we have any responsibility in Africa, it surely must be our duty to do our best to preserve that heritage until the Africans themselves can see its worth. While we have any responsibility in Africa, we must surely remember the saying of His Majesty King George VI, 'The wild life of to-day is not ours to dispose of as we please. We have it in trust. We must account for it to those who come after.'

If we, the British, are unable to account for that wild life to the Africans who come after us in the government of their countries, we will have failed in that trust. I would emphasize again that our efforts will fall on deaf ears if we preach. We must not preach; we must educate, and we must make Africans realize what their heritage is and how much they will lose should it disappear.

For once, we have on our side in this campaign the financial interest of the African people. Visitors come from all parts of the world to see African game, African scenery and African flora, bringing with them the money that is so needed in the development of the African continent. The very fact that all these people come, helps to make the African realize that there must be something in this heritage of his. I can well remember taking a party of Africans round the Queen Elizabeth National Park, showing them elephants, buffaloes and the wonderful crater areas. They were beginning to realize that they had something in that park which could not be found elsewhere, but what really clinched the matter in their minds was when we were returning to the Safari Lodge: a convoy of sleek cars passed us; they stopped, and out stepped a party of some twenty Americans. Then I was told, 'Well, if they are really prepared to come all this way to see the park and spend all this money in order to do so, there must be something in what you say'. On that occasion, anyway, tourists had their use.

I do not want you to think from what I have said that all is black in East Africa. Just as in Britain it is coming to be realized more and more that a country without wild life is a country not worth living in, so in East Africa the African is becoming aware of the economic and aesthetic value of the wild life of his country. For instance, in Uganda adults and children flock to the small Game Department zoo in Entebbe, local game committees have been set up in a number of areas to manage locally controlled hunting areas, and there has been a wide response to the essay competitions organized by the National Parks on behalf of Alan Moorehead, who has generously donated the prizes.

I have, till now, been talking somewhat in the abstract. Being a lawyer I am not fond of talking in the abstract, and much prefer being able to get down to practical details, and without getting down to those details no game will be safe.

The surest and best known way of securing the safety of an animal is to put it into a zoo. There are, of course, many who believe that such action is also the surest way to destroy the true character of the animal. Nevertheless, without zoos, it would not be possible to examine wild animals closely, and they are a necessary part of preservation for this reason. Without zoos, as has been so ably and efficiently demonstrated by our Chairman, many animals might well become extinct. You will all, of course, realize that for the purposes of my argument, I am including birds in the expression 'animal', and that, of course, in its turn, includes ducks! In any case, there are zoos and zoos. There are zoos like Whipsnade and the Wildfowl Trust where the animals are seen as near their best as is possible in artificial surroundings. One might well describe the Wildfowl Trust as a prison without bars, as so many of the guests are free to come and go as they wish. I think, however, that nobody will dispute the fact that the confinement of animals in a zoo is the worst way of protecting them, although in certain circumstances it may be the only way. Even then it must be realized that zoos would cease to exist if there were no animals living in their natural state from which to stock them.

The next and most common way of protecting animals is the control by licence of their being hunted; such licences may protect the animal by controlling its being hunted either seasonally or numerically. This system of protection appears, generally speaking, to be a satisfactory way of preserving small animals and birds which do not interfere seriously with the economic life of man. By this means many animals have been kept from extinction in the more crowded areas of the world, and it is a method of protection used throughout East Africa. This method is, however, of little or no use in the preservation of animals unless it is backed by both an adequate police force and by public opinion. In the long term it will be of little use as a method of safeguarding animals that interfere with the economic life of man. It is neither practicable nor possible to prohibit a person from shooting an elephant which is trampling down his food or economic crops, and no law should either be made or enforced which tries to prevent him doing so. It also must be realized that no licensing law can ever be effectively enforced which prevents those short of animal protein food going out and hunting for such food if it is available. The Africans in East Africa are short of animal protein foods. I think we can therefore take it that mere licensing laws by themselves will not preserve the animals of East Africa for the future.

The only other way to ensure a future for animals is to set aside properly policed areas in respect of which there are special laws relating to the hunting and control of animals and the destruction of the fauna; as in the long run it is also quite useless to protect an animal unless one also protects its habitat. These areas are sanctuaries, reserves, controlled hunting areas and national parks.

Sanctuaries are areas in which humans may live, but in which hunting, either of all animals or of a particular species of animal is prohibited. The establishment of a sanctuary is by no means the best way to protect the animals in it, for the simple reason that in most areas the interests of the human inhabitants are at

variance with the interest of the animal inhabitants, and in the end the humans always win. To give one example of this, there is in the south-west of Uganda amongst the volcanoes, a gorilla sanctuary—a very small area amongst the bamboos. It is one of the few areas in East Africa where gorillas are to be found; but it seems inevitable that in a few years the gorillas will be driven out of it as the human inhabitants move into it. The area is part of a very over-populated district. Have we any right to say that gorillas shall have pride of place? This must be for the people themselves to decide. But meanwhile it is up to us to show the people that not only in this area, but wherever there are sanctuaries,

[*R. M. Bere*

Murchison Falls

it is both wise and sensible to set aside part of their country so that wild animals may be preserved for posterity.

Next we have controlled hunting areas, which are areas where hunting is allowed, but the amount of hunting is controlled either in regard to all animals, or to particular species. Human habitation in such areas is not prohibited. The value of these areas is that the amount of hunting can be controlled so as to keep it at a level which will ensure that the animal population is kept at the optimum level. The future of these areas, in the same way as the future of sanctuaries,

must in the long run depend on the will of the inhabitants and the spread of their dwellings.

Let us now turn to game reserves, which are areas in which no hunting is allowed and in which, generally speaking, no person is allowed to live without permission. The boundaries of these reserves can be altered at the will of the government of the day, and therefore there is little guarantee that they will continue to exist. But so long as they do exist, the game in those areas is completely and absolutely safe. Having animals in a game reserve is, however, like having a diamond in a safe. It may be a very beautiful diamond; in fact, it may

[*R. M. Bere*

Crater in Queen Elizabeth National Park

be unique, and there may be some satisfaction in knowing that you own such a diamond, but I would suggest that having it in a safe where neither you nor anyone else can see it, is indeed pointless. There are many of us who now believe that areas of land not suitable for human occupation should be set aside as game reserves in which animals such as buffalo and eland would be allowed to range and would be culled as an economic crop. In this way it is believed that better use can be made of the land than attempting to breed domestic animals on it.

Lastly, we have national parks, which are areas of land permanently set aside for the benefit of the wild life within such areas in order that such wild life, including the flora, may be enjoyed by mankind indefinitely. I stress the word 'indefinitely' for a reason which will become apparent presently. National parks are under the control either of boards of trustees, or special officers of the Government, and are managed by them for the benefit of the people of the country in which they are situated. Generally speaking, human habitation is not allowed in national parks, although there is limited habitation in some parks. Whether there is habitation or not, the first duty of the trustees is towards the flora and fauna while, at the same time, making provision for it to be enjoyed by man. Much as the disappearance of big game is to be regretted, I am afraid there is little doubt that the only sure future of the big game animals in East Africa will be in the national parks.

The rest of my remarks therefore will be in relation to national parks. The problems of administering these parks are relevant in either a greater or lesser degree to the preservation of game in all other preservation areas. I will be posing a number of questions. In very few cases will I be able to give you the answers as neither I, nor, do I believe, anyone else knows them. Perhaps somebody here to-day will be able to help, but I can assure you the easier the answer seems, especially if it is based on sentimentality, the less likely is it to be correct.

In order that you may get some idea of what a national park is like, I will attempt to describe very briefly the two parks in Uganda to you.

The Murchison Falls National Park is a thousand square miles in area; the Queen Elizabeth National Park is 750 square miles—that is to say, it is larger than the county of Surrey. Outside Uganda there are some parks which are as small as 40 square miles; there are others that are as large as twelve thousand square miles—that is to say, twelve times the size of Surrey. For roughly the last 40 years no one has lived in either of the two Uganda parks save for a few fishermen by the lakeside in the Queen Elizabeth Park. Both these parks were cleared of their human population, as they were covered with tsetse fly of the type that carries and was then carrying human sleeping sickness. To-day there are still tsetse fly, but owing to the fact that they have not been in contact with carriers of sleeping sickness, it is quite safe to live in and visit the parks.

The Murchison Falls Park is a wild area, much of it covered by elephant grass which for about half of the year is over six foot in height. Through the middle of the park run the Nile and the Murchison Falls after which the park is named. The river trip from the Safari Lodge to the Falls is unique; the river is about 300 yards broad, tropical in the best Rider Haggard sense, and vast numbers of animals come down to the river to drink, particularly in the dry season. In the river itself there are hundreds of hippos and crocodiles. In the rushing waters under the Falls, which are 140 feet high and constrict the river at one place to a width of 19 feet, there is magnificent fishing for Nile perch, and fish up to and over 100 pounds can be caught on rod and line.

The Queen Elizabeth Park at the other end of the Protectorate is quite different. The country is short-grass country and is much less wild, as main roads run

through it and in certain areas habitation comes right up to its boundaries. In fact, small townships lie within the park but have been artificially excised from it. In the west there is an area of extinct volcanic explosion craters which are full of game in the wet weather; it is indeed an area of remarkable beauty with tremendous views over the plains and lakes, and the Ruwenzori range of mountains, the famous Mountains of the Moon, present a magnificent picture in the background. Within this park there is also a waterway, the Kazinga Channel, some 20 miles long, which joins Lake Edward to Lake George. The park goes round most of the east and north of Lake Edward and joins up at its extremities with the Parc National Albert in the Belgian Congo.

In both the Murchison Falls Park and the Queen Elizabeth Park are to be found hundreds of elephants, buffaloes, antelopes of different kinds, hippos and lions, as well as several other African cats. In the Murchison Falls Park there are also crocodiles, rhinos and giraffes. In both parks the bird life is quite exceptional, and there must be few places in the world where so many species can be seen in limited areas.

Such are the two areas managed by the Trustees of the Uganda National Parks. Similar areas are managed in East and South Africa by similar bodies, and it is these areas which we hope to preserve for future generations, and it is about their administration that I propose to talk now.

As soon as one mentions national parks, the man in the street thinks of poachers, and his mind turns to the exciting stories of the hunting and catching of poachers. So, first of all, it is about poachers that I wish to speak. There are two types of poachers; first, the commercial poacher, and secondly, if I might call him by that name, the private poacher.

The commercial poacher is a man poaching on behalf of business and sometimes on behalf of big business, and when I say big business, I mean big business. Until recently we, in Uganda, have been reasonably free from the commercial poacher. In Kenya his activities reached such a stage that he had to be hunted in the same way as a military enemy. The commercial poacher is largely concerned with the killing of elephants and rhinos in order to sell their tusks and horns. The Tsavo National Park of Kenya, a large park of some 8,000 square miles in the east of Kenya, was raided over a period of years by bands of these poachers who killed thousands of elephants, taking their tusks to the coast where they were bought by middlemen and exported abroad. The trade became so large and so efficient that until emergency measures were taken, it looked as if the elephant population in that park would be exterminated. Fortunately, a campaign in which rangers, police and aircraft were used was started and the poaching has, to a large extent, been brought under control. Fortunately it is not common in Uganda, although in recent months the Murchison Falls Park has been the scene of determined efforts by commercial poachers who have been hunting crocodiles in order to take advantage of the high prices offered for crocodile skins.

The second type of poaching is what I call private poaching: that is, poaching by individuals living near the parks mostly for meat for their own consumption

[R. M. Bere

Elephant with its trunk mutilated by a wire snare

or that of their close associates and friends, although the meat is also sold on a small scale. These poachers, of course, also trade to a small extent in elephant tusks and rhino horn. Private poaching will, if not stopped, turn into commercial poaching; and where you have a community that is short of meat, a ready and regular supply of meat always brings in good money, so there is a temptation for gangs to start poaching on a large scale. So far as Uganda is concerned, owing to the enormous population of game in the parks, private poaching on a small scale does no real harm. Its main harm lies in the manner in which the poachers hunt their quarry. Poachers rarely use efficient rifles; if they have rifles at all, they are either home-made or very old. The result is that when they shoot, only a small percentage of the animals they shoot at are killed, a very large number of them being left wounded and in agony. More frequently than using rifles, however, they use their spears or wire snares. The animals caught in these snares are often left for days in their misery and very often—too often in fact—small snares made for small antelope catch elephants and the other larger animals which are done permanent injury. Many, indeed, are the elephants whose trunks have been cut off by snares; many, indeed, are the elephants who

are found painfully dragging snares by their legs, the legs being bruised and swollen to twice their normal size and covered by festering sores. Some of these animals are snared in the parks; many are snared outside, but when in the parks, owing to the pain they are in, they are wild and angry animals and a danger to visitors. Many have had to be destroyed by our wardens. Thus we have to carry on the unceasing battle against poachers. In that battle, many hundreds of wire snares have been collected. The battle will go on as long as the African is short of meat and the price of ivory and rhino horn remains high in the world markets. The problem of poachers is, however, easy to understand and with an adequate purse can be dealt with.

The next problem which I am going to discuss is a far more difficult one, and its solution is far from being in sight. Large animals are destructive. The most destructive of all animals is the elephant; in a night a herd can wreck a year's work on a farm. The farmers must be protected. When farms are on the edge of national parks the problem is both to protect the farms and to protect the animals. Elephants, in particular, are migratory by habit and travel many miles in a year. The problem of their migrations is one I will deal with in a little while. Even if a healthy elephant population can be maintained behind a fence, they cannot, in fact, be fenced in because the expense of building a fence formidable enough to keep in elephants is an expense which cannot be contemplated. What are we to do then? The most usual solution suggested is to have a belt of land round each park where shooting is allowed but where habitation is not allowed. If, however, such a belt is outside the park, the local people will object and say that more land is being taken for the park. If it is within the park, then the Trustees object and say land is being taken from the park. In both the parks in Uganda the die has unfortunately already been cast in some places. There are cotton and food plantations already on the boundary line. There is one area in the Queen Elizabeth Park which is only two miles wide and it is at this point that plantations have come right up to the boundary. Another solution that has been suggested is to put on the ground a strip of strong smelling chemical which the animals will not cross. So far, experiments on a large scale have not been successful. It sounds attractive when one thinks of a small lawn, but becomes less attractive when one thinks of miles of Africa washed by torrential rains.

Poaching and the control of animals within and without the parks are man-made problems. What now are the Nature-made problems? The first and most interesting one is the problem of the food supply of animals within a park. In the Queen Elizabeth Park there are 14,000 hippos who eat nothing but grass; they appear to be eating the park down to the bone, leaving no food for themselves or for the other animals. In one area of the Murchison Falls Park, the elephant population varies from 4,000 to 12,000. We are told that they also are eating themselves out of house and home. There are two schools of thought as to what should be done.

Firstly, there is the Belgian school of thought being presently practised in the Belgian Congo National Parks, and that is to study but not to interfere. Those administering the Congo Parks believe that Nature must take its course, and that

[*R. M. Bere*

Hippopotamuses in Queen Elizabeth National Park

organized interference by man is wrong. They adopt the view that by interfering with Nature we shall learn nothing. They say that if there are too many hippos in an area, then Nature will find a cure. The population crash will come; the hippos will cease to breed and gradually their numbers will be decreased. If in the meantime the park is turned into a desert, then that will be a fact to be noted and it will also be interesting to see how long it will take before the park is restored by Nature to its former state. They go on to say that even if you try to control Nature, you will, in the long run, not succeed because even if you keep a few herds of healthy animals all you have created is a man-made zoo and not a national park. They add that even then for reasons you have not reckoned with, the park will, in any case, go Nature's way and not yours.

The other school of thought adopts the view widely held in America, and says that a national park should be run in the same way as a farm, and that you should keep the animal population at a level which the soil will support. They say you should work out scientifically how many hippos, how many elephants, and how many antelope can live healthily on the park and you should keep the number at that level, taking into account the number of predators, such as lions, leopards and wild dogs that are helping you to do the job.

This then is the greatest problem we have to face. Should trustees treat animal life in national parks as sacrosanct? This has been the view in East Africa until recently. If, however, trustees adopt this policy and a national park is turned into a desert (and this could have a long-range effect on the climate of a whole region), will the trustees not be guilty of a breach of trust? On the

[*Uganda Information Dept.*

Crocodile beside the Nile, Murchison Falls National Park

other hand, is it right to turn a national park into a sort of farm or zoo, so that Man and not Nature is the ruling authority? And if one does do that, is one sure the farm will be successful? Will one's wardens become little more than huntsmen?

To take an extreme example, we have been told that the optimum population of hippo in the Queen Elizabeth Park is seven thousand, which is half the present population. If we are to reduce the number of hippos to seven thousand, then straight away we must kill seven thousand. Taking it that the number of males and females is equal, there will be 3,500 females. Of these, half will be of breeding age and each will produce a calf rather less often than once a year. This means that the natural yearly increase will be about 1,400, so that we should have to continue shooting that number every year to keep the number down. This is perhaps an over-simplification of the problem, but it does show in bold perspective what control operations may lead to, and if we are to crop every other animal in the park in a similar way, it would seem that we might be running a vast butchery rather than a national park.

Experiments in controlling animals in the past have not always been a great success. At one time in one national park outside East Africa there were thought to be too many lions. There was a campaign against the lions. Shortly afterwards, as a result of the reduction of the lions, it was found that there were too many antelope and not enough food for them to eat. Wild dogs always have been

considered the enemy of preservation as they break up the herds of antelope and drive them away from their normal feeding areas. They were treated as vermin in our parks. It is now recognized that they are not, perhaps, the enemy they were thought to be, for, by breaking up the herds, they scatter and mix up the antelope and so prevent excessive in-breeding. Perhaps it has been a mistake to remove Man from the parks because by his removal we have removed the only natural enemy of some of the great beasts. Man does not, of course, take readily to living in a zoo!

You will wish to know what at the moment we are doing about these problems. Are we sitting still and thinking, or are we trying to do something? At the moment we have in hand an experiment. By shooting we are keeping clear one small area of the Queen Elizabeth Park from hippos, and in another area, we are keeping it 50 per cent clear. We are, of course, not banning any other animals. The experiment has only been going on for some two years and I cannot tell you the results. At first it appeared that the grass cover was improving, but then we had a year of drought and it is difficult to tell now whether there is any improvement or not. We will have to carry on the experiment for several years yet until we have any sort of conclusive answers to the problem.

Although we have our problems of too many animals, we have been pressed, off and on, to introduce into the parks several other species which are in danger of extinction. For instance, we have been asked to introduce into the Murchison Falls Park the white rhinoceros, which is a type of rhino quite different from the black rhino already found in the park.

The problems which arise from the introduction of new species into a park are many and varied. The species may, of course, flourish and get on with its neighbours, in which case the experiment will be a success. On the other hand, the species may die out immediately owing to the fact that it cannot live in the selected area or it may become the enemy of some other species and destroy it, or it may overrun the land and extinguish all the vegetation. One cannot help but have in mind the rabbits in Australia. At the moment, we have made no decision in regard to the white rhino.

The one thing that stands out a mile from all I have said is that trustees of national parks should have continuous experienced scientific advice. At the moment the Trustees of the Uganda National Parks lack this.

These then are our main problems. They are the problems of game conservation in East Africa. There is one solution to them all and that is education—not only must we teach the public but even more important, we must teach ourselves. Game is fast disappearing in Africa. In England we breed pheasants in order that we may later shoot them; we cannot do that with elephants. Once they have gone, they will have gone for ever. The day is now long past when we can rely on and accept as a matter of course the untrained observation of the hunter. We must have trained men to teach us, not only in order that we can conserve the dwindling game population, but also so that we can with assurance pass the message on to others. It is the backing of learned societies such as this one that we look to for assistance.

DISCUSSION

MR. P. D. I. SCHALBURG: When I was in Southern Tanganyika we had a lot of trouble with the elephants, and we developed a temporary system of driving them by means of thunder-flashes and gunfire (not aimed at them, of course). I wonder whether that has been possible in Uganda?

THE LECTURER: It is possible to drive raiding elephants from plantations by means of thunder-flashes and the like. But as a long-term policy it is not possible in Uganda, because our parks are being surrounded by plantations. If we have too many elephants in a park, the last thing we want to do is to drive them into forests bordering the park, or into plantations. It is a hit and miss job trying to drive elephants, especially if they are in very large herds; and elephants in the Murchison Falls Park can be found in herds of up to a thousand strong.

MR. GORDON WINTER (*Country Life*): May I ask Mr. Dreschfield to tell us a little more about the commercial possibilities of running the control of game in parks, as has been done in North America by their farming method? Is it not possible that by farming you can, in some respects, make it commercially attractive?

THE LECTURER: This is something we have been dealing with in Uganda and in our National Parks quite a lot. The Americans, of course, and quite rightly I think, insist that if you are going to destroy animals in a control operation (or in keeping the numbers down), it is utterly wasteful and morally wrong just to leave the corpses to rot or to be torn to pieces by hyenas or vultures. The great difficulty is the expense. You can drive cattle to a slaughter-house, and from there you have the means of moving their carcasses to butchers' shops and the like. With game, of course, you cannot do that. You may be shooting it twenty or forty miles from the nearest railhead, and perhaps as many miles from a place where you can get a suitable lorry. The operation then becomes entirely uneconomic. Another difficulty can be illustrated by the case of hippo meat, which we have had difficulty in selling because—and this applies to a very large extent to other game meat also—it goes bad very quickly and also may be infected with anthrax. Our veterinary and medical departments won't allow us to sell any of this meat in town markets or in the big areas of population unless each carcass has been examined for anthrax.

There are plants which mash up the meat and turn it into manure—disintegration plants, I think they are called. They are extremely expensive. There is a disintegration plant in one district of the country, and it cost about £10,000. No government is going to provide £10,000 for this purpose.

I do believe that we may be able to use wild animals commercially if we can think of a way of being able to collect the meat economically and find a market for it. What we have really got to set up is an efficient marketing organization; then perhaps we can think about the comparatively easy job of shooting the animals.

MR. GEOFFREY C. GRANT: Could Mr. Dreschfield tell us something of the problems which arise from the changes in natural animal behaviour resulting from the presence of human beings in the parks. Is this serious, and what changes result?

THE LECTURER: It is extraordinary that the animals in the parks very soon get used to human beings, if they stay in motor cars; and the greater the contact, the greater the tameness of the animals. The real illustration of this is to be found in the park outside Nairobi, the Royal Nairobi National Park, where there are literally hundreds of motor cars every day and the animals pay no attention to them at all. We have found that when we first open up an area of the park the animals are shy, but very soon, when they realize that a car is something not to be frightened of,

they pay very little attention. It takes animals a very long time, however, to get used to the smell of the human being, which is particularly distasteful to them. It is found that if you get out of your car the result is very different from that when you stay inside!

Another extraordinary thing is that when we first started to shoot hippos in the limited areas in the Queen Elizabeth Park, we were all quite certain that it would upset the other game. It did not do so at all, and we had to drive away elephants and buffaloes which were watching the hippo being shot.

MISS M. POTTEN: The story about the fox—was that a true story?

THE LECTURER: Absolutely true.

MISS POTTEN: What county was it ?

THE LECTURER: Sussex.

THE CHAIRMAN: The lecturer was describing the size of the parks. To us in England a park which is the size of Surrey sounds large, but when you put all the national parks in Africa on to the map as little red dots, and then look at them in relation to the whole of Africa, they are a pitifully small area. I wonder whether Mr. Dreschfield can tell us anything about the prospects of any increase in the area of national parks in Uganda, whether there is a possibility of getting any more land?

THE LECTURER: It would be too optimistic to say definitely yes, but there is a faint possibility. Some five or six years ago the Africans in Uganda were one hundred per cent against national parks; now they are only about sixty per cent against. They are really beginning to see not only the commercial possibilities, but I believe they are also starting to realize that they have something in their national parks that others have not got; so from this growing opinion I think in a few years time there will be a possibility of getting more national parks. But what one must remember is that in Africa, even more than in England, land is sacred, and any attempt to take land away for what appears to be a foreign purpose is very strongly resented. I think the best prospect of getting more national parks in Uganda will be when Uganda becomes independent. Then it will not appear that the Englishman is taking the Africans' land from them. At the present moment, partly owing to an English Member of Parliament who came out to address the crowds against national parks, the Africans in Uganda really do believe that it is the Englishman who is taking their land from them. Of course, when we are not there we cannot be said to be taking their land from them; and if by that time we have really taught Africans the value of national parks, I think there is a chance of being able to preserve greater areas of land for the animals.

MR. J. H. HALL: Is there any system for giving the Africans a share of entrance fees paid to the national parks of Uganda? The kind of thing I have in mind is the charging of an entrance fee, a quarter of which might be payable to the local treasury.

THE LECTURER: At the present moment half of the entrance fees do go to the local government in whose area a park is situated, but of course there is no equity and never will be, because national parks will always be run at a loss. The profit comes not from the actual running of the national park, but from the money which is brought into the country by the visitors who visit the national parks. By analogy, there is no profit from receipts at Westminster Abbey, and Westminster Abbey itself is run at a loss, but the people who come to see it bring very large sums of money into the country, and as a result Westminster Abbey is definitely not only a great cultural asset, but a great economic asset too.

MR. H. ARMSTRONG: Have the trustees considered using a virus to reduce the number of hippos, rather like that used against our rats and moles in this country?

THE LECTURER: We have not. I hope that we shall not have to consider it. Before we started anything of that nature we should have to know precisely where it was going to lead us, because if we started to kill the cattle in the country as well as the game we really should be in trouble.

The discussion was then concluded, and the film 'Birds of East and Central Africa' was shown.

THE CHAIRMAN: Let us all go to Africa! I hope you agree with me that we have had a wonderful afternoon: that glorious film, a masterly survey of the whole problem of the protection and preservation of wild animals in Africa, and some interesting questions admirably answered. So let us thank Mr. Dreschfield.

A vote of thanks to the Lecturer was carried with acclamation.

SIR HILARY BLOOD, G.B.E., K.C.M.G. (Chairman, Commonwealth Section Committee): Before we go to Africa let us go to tea; and before we go to tea, may we give a hearty vote of thanks to the Chairman? He is one of those people who touch life at many points. We know him as a broadcaster, and as a television star. He is a very considerable ornothologist and naturalist in his own right. He is also an author, a painter and an illustrator. He is a very good yachtsman, and, as you have heard this afternoon, he does a bit of gliding on the side. But there is one activity of his which is perhaps not so well known: that is his work for young people's clubs down in the West Country, and with the Council of the Boy Scouts Association. It is because of those activities that I think Mr. Scott will have been pleased, as we have been, to see so many young people in the audience this afternoon. We are very glad to welcome Mr. Scott to this building to-day and I propose a warm vote of thanks to him.

The vote of thanks to the Chairman was carried with acclamation, and the meeting then ended.

GENERAL NOTES

ROYAL INSTITUTION OF NAVAL ARCHITECTS CENTENARY

On 16th January Viscount Runciman, the President of the Royal Institution of Naval Architects, sent a telegram to H.R.H. the Duke of Edinburgh, President of this Society, recalling, 'with pleasure and gratitude', that the Institution was established at a meeting held in the Society's House a century ago.

The *Journal* of the time (Volume VIII, 1859–60, p. 149) carried a record of this founders' meeting, including a full statement of the Institution's scope and objects made by its first Secretary, E. J. Reed (then editor of the *Mechanics' Magazine*). From this it is clear that the want of such a body had been long felt, and that it was anxiety about the Royal Navy in the previous year which brought the matter to a head. 'Several gentlemen, some of them without and some within Her Majesty's service took up the subject, quite independently of each other at first', and resolved to bring about the desired result. Their preliminary canvassing was so successful that even before the meeting in the Society's House, a number of eminent men, including the then First Lord of the Admiralty (Sir John Pakington), the Earls of Ellenborough and Hardwicke, Sir Francis Baring, Sir James Graham and Sidney Herbert, had consented to become Vice-Presidents.

The influence of the newly formed body was soon demonstrated. Its inaugural meetings, also held in the Society's House early in the succeeding March, not only saw the general professional objects of the Institution forwarded by papers read by distinguished scientists and engineers, but had an important result of public significance. The 'Lloyd's Rules' of the period had not kept pace with developments in ship-building, and were felt as a positive hindrance to improvement, inasmuch as no ship-owner who wished his vessels to remain in Lloyd's List could depart

from them. This grievance was ventilated in papers read to the Institution, provoking a discussion on the spot with two of Lloyd's surveyors, who undertook to co-operate in all reasonable ways with a view to the continual improvement of the art of ship-building. The *Journal* underlines the dual import of this amicably won victory: 'Thus a most serious question has been settled to the manifest advantage of the public, for, while every real improvement of our passenger and merchant ships . . . will be guaranteed against obstruction, no countenance will . . . be shown to any injurious change by the practical shipowners who compose the Institution. This single result will amply repay all the paints taken in the establishment of the Institution of Naval Architects.'

THE MAGDALEN STREET, NORWICH, EXPERIMENT

The improvements made in the appearance of Magdalen Street, Norwich, during the spring of last year aroused wide interest, alike for their own sake, as a novel experiment in civic design, and as an example of what united effort by seemingly diverse interests can achieve to the common advantage. All these aspects, but particularly the last, are well brought out in the illustrated survey of *Magdalen Street, Norwich, 1958–59* (price 5*s*.), recently published by the Civic Trust, which initiated the venture and, through its co-ordinating architect, Misha Black, brought it to a successful end. By means of a photographic panorama the reader is enabled to study the old Magdalen Street and compare it with the new. The rejuvenation is impressive, and will surely act as a spur to emulation in other towns. This publication suggests that 'though the end-result in Magdalen Street does not provide a pattern for copying elsewhere', and 'is not a panacea for all urban problems', there are few streets which could not benefit from a discriminating application of the principles so well tested there.

EXHIBITION OF FRENCH EIGHTEENTH-CENTURY FURNITURE DESIGN

An exhibition illustrating French eighteenth-century furniture design is on view at the Arts Council Gallery in St. James's Square until 19th March. Consisting principally of drawings, lent from the Musée des Arts Decoratifs, Paris, the display also includes some outstanding examples of French furniture borrowed from private collections in this country. The Queen has lent a commode by the ébéniste who stamped his work B. V. R. B., and a low cabinet bearing the mark of Weisweiler; and there are also works by J.-F. Oeben, Carlin and Kemp. Entry to the exhibition costs 1*s*. (which also admits to the Exhibition of Contemporary Polish Graphic Art on view at the same time). The hours of viewing are as follows: Mondays, Fridays, Saturdays, 10 a.m. to 6 p.m.; Tuesdays, Thursdays, 10 a.m. to 8 p.m.

During the spring the exhibition will be shown at Temple Newsam, Leeds, and at the National Museum in Cardiff.

'CRAFTS IN LONDON SCHOOLS' EXHIBITION

The work in handicrafts of London schools is the subject of an exhibition to be shown at County Hall, Westminster Bridge, London, S.E.1, from 2nd to 19th March. The exhibition will demonstrate the new approach to craft education in primary and secondary schools, and show how teaching in this field has become an integral part of general education. There is no charge for admission to the exhibition, which is open on weekdays from 10.30 a.m. to 8 p.m.

TRAVEL GRANTS IN THE FIELD OF THE ARTS

The English-Speaking Union again announces the offer of four Travel Grants to the United States in 1960–61, for which application may be made by men and

women between 30 and 50 years of age who are experienced in a branch of the arts such as painting, travel, music, architecture or design. Museum curators and art historians are also eligible.

These Grants are intended for those who have not previously been to the United States, and their basic purpose is to improve the degree of understanding between that country and the United Kingdom. Each Grant provides for travel to and from, and travel within, the United States. There is also a subsistence allowance for each day spent in the United States up to a maximum of 56 days (which is the recommended length of the visit). The Grant may be taken up any time after mid-September, 1960, but the tour must be completed before 1st July, 1961.

Full particulars and application forms may be obtained from the Secretary, The English-Speaking Union, Dartmouth House, Charles Street, London, W.1. The closing date for the receipt of applications is 7th May, 1960.

OBITUARY

MR. A. C. HARTLEY

Mr. A. Clifford Hartley, C.B.E., B.Sc., M.I.C.E., M.I.Mech.E., a Member of Council of the Society from 1952–8, and a Fellow since 1947, died in London on 28th January after a short illness, aged 71.

Sir Philip Southwell writes:

Born and educated in Yorkshire, Hartley began his engineering studies in 1906, and in 1910 he graduated in engineering at London University. After leaving London University he became a pupil with the Chief Engineer of the North Eastern Railways, Hull Docks, and later had mechanical engineering experience with Rose Downs & Thomson of Hull and with the Limmer & Trinidad Asphalt Company. During the 1914–18 war he was commissioned as a pilot in the Royal Flying Corps, appointed O.B.E. and twice mentioned in despatches. His engineering activities included work on the development of the Constantinesco Synchronising gear to enable machine guns to be fired through the rotating propellors.

Hartley began his engineering activities in the oil industry with the Anglo-Persian Oil Company in 1924 and in 1934 was appointed Chief Engineer to lead the Engineering Department, a post he held until his retirement in 1951. Since his retirement he had been in private practice as a consulting engineer, and associated also with Messrs. Rendel, Palmer & Tritton.

During the 1939–45 war, Hartley was seconded by his company for work in connection with automatic bomb-sights, and in 1940 and 1942 worked on the development of 'Pluto', the oil pipeline which was, in due course, laid across the English Channel for a supply of oil to the armies in the field—an operation which he described in a paper read to the Society in November, 1945. This pipeline, later known as H.A.I.S. (Hartley Anglo-Iranian Siemens), was the subject of a recommendation by the Royal Commission on Awards to Inventors for an award of £9,000.

In 1942 Hartley was appointed Technical Director to the Petroleum Warfare Department and in this capacity was associated with the work for 'Fido', the airfield fog clearance system. In a paper read to the Society in November, 1946, he gave an authoritative account of this invention. His work in connection with

'Fido' brought him the award of the United States Medal of Freedom, and in 1944 he was appointed C.B.E. A Fellow of the City and Guilds of London Institute and an Honorary Fellow of the Imperial College, he was elected President of the Institution of Mechanical Engineers in 1951 and in November, 1959, took office as President of the Institution of Civil Engineers, a position he held at the time of his death.

Yorkshire has provided many famous men and Hartley takes his place as a great Yorkshireman with wide interests, a Freeman of the City of London and Member of the Shipwrights Company, and Vice-President of the Institute of Petroleum, whose Redwood Medal was awarded to him last year.

In addition to taking his full share in the work of the Society's Council, and contributing to its proceedings, Hartley gave valuable service to the Industrial Art Bursaries Competition. As Chairman, since 1956, of the Jury responsible for assessing the entries in the Electric-Light Fittings Section of the Competition, he displayed an attentiveness and discrimination which, together with his wide understanding of engineering techniques, will be especially missed in this sphere.

MR. NEVILE SHUTE NORWAY

Mr. Nevile Shute Norway, who died in Melbourne, Australia, on 12th January, aged 60, won distinction as a novelist and an aeronautical engineer. He realized this dual bent whilst still a boy, and his success in both spheres was deserved, modestly worn and firmly based on both natural gifts and hard work.

Norway went to school at Shrewsbury, and after brief periods at the Royal Military Academy, Woolwich and as a private soldier at the end of the First World War, proceeded to Balliol College, Oxford, where he took his degree. In 1922 he joined de Havillands, at Hendon, as Calculator. Six years later he was appointed Deputy Chief Engineer to the Company. He thus shared closely in the excitement and struggles of those comparatively early days of aircraft development, and met problems of design that tested his powers to the full. His own experience of flying included two transatlantic trips in the airship R.100, which he had helped Barnes Neville Wallis to build.

In 1931 Norway decided to put his ingenuity and skill to his own service, and founded the firm of Airspeed Limited. The period which followed he found less satisfying, for the prevailing financial difficulties obliged him to devote a growing, and growingly unwelcome, amount of time to the business of management. At length, in 1938, with little regret he gave up his interest in the firm, and thereafter, apart from the responsible duties to which he was assigned in the Royal Naval Volunteer Reserve during the war, he devoted his energy to writing.

This was not just the resumption of an early interest. He had been writing ever since his Shrewsbury days, undeterred by the failure to find a publisher. His *Ruined City*, published in 1938, was his fourth completed novel, but the first to achieve public recognition, which was subsequently extended to his work in increasing measure. Norway brought to the making of a book the same scrupulous care he would give to the making of an aeroplane, but there is no sense of labour behind the conviction carried by his stories, or the people he put into them. Whether his novels have enough of imaginative power to endure into another age may, perhaps, be debated; but a partial explanation of their quality lies in his undoubted narrative skill. Several of his novels were most successfully adapted for the cinema, including *Pied Piper* (1942), *No Highway* (1948), *A Town Like Alice* (1949) and *On the Beach*, which is in current distribution in this country.

Norway had lived in Australia for several years before his death, visiting this country only at intervals. He had been a Fellow of the Society since 1948.

NOTES ON BOOKS

SHROPSHIRE. *By Nikolaus Pevsner. Harmondsworth, Penguin Books,* 1958. 8*s* 6*d net*

This is the sixteenth in 'The Buildings of England' series, and one tends to make comparisons with the other volumes (a further volume has been published). There is a marked improvement in the handling of this county, which may reflect the kindness and helpfulness received by Mr. Pevsner from its inhabitants and visitors. In addition to the usual facilities made available for compiling such a guide to the county's buildings, and the financial support of the Leverhulme and the Walker Trusts, a number of American members of the Attingham summer schools on British Country Houses made donations. Anyone who has participated in similar courses there, will have experienced the great pleasure of being in Shropshire, and Sir George Trevelyan's enormous enthusiasm for it.

An improvement is the author's restraint from including his personal bias towards some periods of architecture. The serious student appreciates a judgement on quality when given by the expert—and Mr. Pevsner asserts that he has seen everything himself—but he or she dislikes the addition of the personal opinion, especially when this is directed against his or her preference in style or period of architecture; it may effectuate a prejudice against other volumes of the series. For the rest, the book is very thorough both in the historical survey of the county as a whole, with helpful reference to other publications on it, and in the individual references (in alphabetical order) to its towns and villages. This follows the pattern of the series, and whilst there is no reference to such local landmarks as the Arbor Tree at Aston-on-Clun (for the obvious reason that it is not a building) the reader can discover, for instance, the structural style of the Kangaroo Inn.

For those who know something of Shropshire, whether as resident or visitor, this book will provide a wider knowledge; and how many people really know their own county? The prospective visitor or armchair traveller will find much to stimulate his interest and speed him on his way to it. Those who have enjoyed other volumes will derive equal if not more pleasure from this one. It is illustrated with 104 photographs.

J. TREVOR WHITE

MAN AND ART. *By C. A. Burland. London, The Studio,* 1959. 35*s net*

The cult of the Primitive became something of an obsession during the period between the two great World Wars. Perhaps this was a healthy reaction against the artificialities of the art of the late nineteenth-century, a reaction which made itself felt in France with the emergence of the 'fauvists' or perhaps even a reaction against those artists with their affectation of 'primitiveness'. Anthropology became the fashion with psychology, nature cult and one or two of the darker arts. Collectors of primitive art, particularly of African and Oceanic carvings and masks, found themselves with a profitable line of 'objects' on their hands. The awakening interest in primitive art aroused by more and more discoveries of work of the Palæolithic period, the cave paintings of the Bushmen of Basutoland, the caves at Lascaux and the rock shelter paintings of the aborigines of North-Western Australia, added fuel to the fire of the enthusiasm of these neo-primitives.

So many admirable books have been brought out on the subject that one would have thought that little more could have been found to say. But there is always room for a well-made book on any subject and we should welcome them all in this sadly mechanized age. *Man and Art* is indeed a pleasant addition to the long list of excellent books on art and kindred subjects produced by The Studio for which art students for many generations should have been duly grateful. It has ninety-six pages of illustrations well displayed on its 9″ x 11½″ pages, with a great many in colour.

The text occupies thirty-one pages. Mr. Burland has dedicated his work to the late William F. C. Ohly, a sculptor and collector of the primitive who provided a home for many a young artist. He established the Abbey Art Centre in New Barnet, near London, and perhaps his influence and the influence of this book will provide a bridge of understanding to the whole question of man and his magical feeling for the things he creates with his hands.

The author is not concerned with primitive art alone, but with Man, as he puts it, 'projecting desire for love into the forms which reflect his own soul. Pygmalion and Galatea ever reinforcing each other.' Germain Bazin in his *Concise History of Art* took 500 pages interlarded with pictures to tell the whole story. Mr. Burland has achieved a considerable feat of compression with his. He has tried to associate modern and ancient man with the concept of art as an act of love, and his examples range from the Stone Age men, through the Gothic and Chivalrous periods, through the refinements of Eastern, Greek and Minoan civilizations, to our own time. Sometimes the comparisons made seemed inconsistent until one understood fully the author's theme. Soon, however, the drawings by Australian aboriginal children of their tribal corroborrees and that by Patrick Butler, aged 5, of Bristol, fell into line with those of J. Harrison Begay, of New Mexico, showing riders on horseback, and the Hindu creation carvings from the Bharhut Stupa of the second century B.C.—and the author's pattern took shape.

So, from fertility magic to the biscuit moulds of Swabian folk-art, we have a tremendous range of illustrations to study.

The book will well repay the student's careful attention. D. J. FINLEY

SHORT NOTES ON OTHER BOOKS

THE CATHEDRALS OF FRANCE. *By R. P. Howgrave-Graham. London, Batsford, 1959. 35s net*

After a long introduction in which he seeks to clarify the essential principles of structure and design in French Gothic architecture, the author proceeds to describe in detail all the most notable cathedrals in the country. There are 121 photographs. Mr. Howgrave-Graham, who died in 1959, was a trained engineer and well-known for many years as an official of the Muniment Room and Library at Westminster Abbey.

TURKISH ISLAMIC ARCHITECTURE IN SELJUK AND OTTOMAN TIMES 1071–1923. *By Behçet Ünsal. London, Tiranti, 1959. 30s net*

The types of architecture discussed in this scholarly work (which has 130 illustrations) include mosques and convents, educational institutes, hospitals, caravanserais, market halls and public baths. The author is Professor of the History of Architecture at the Academy of Fine Arts in Istanbul.

THE VILLAS IN REGENT'S PARK AND THEIR RESIDENTS. *By Enid Cecil Samuel. London, St. Marylebone Society Publication No. 1, 1959. (Distributed by Strathmore Bookshop, 145 Park Road, N.W.8.) 5s*

Historical and biographical notes, villa by villa, from the first occupation until the present day, conveying a good deal of interesting information which is not available so handily elsewhere. It is essentially a compilation, and no claim is made to exhaustive research. With a map, 15 illustrations, bibliography and index of residents.

A DICTIONARY OF ART AND ARTISTS. *By Peter and Linda Murray. Harmondsworth, Penguin Books, 1959. 5s*

Covering the last seven centuries in Western Europe and North America, this work contains short biographies of more than 700 painters, sculptors and engravers,

and articles of varying length which define and describe technical terms and processes. In the biographies frequent and illuminating use is made of cross-reference to the work of other artists, or to artistic movements, or to ideas and styles.

THE SCULPTURE OF THE PARTHENON. *By P. E. Corbett. Harmondsworth, Penguin Books*, 1959. 5*s*

Forty plates illustrate the best preserved portions of the Parthenon frieze and representative examples from the surviving metopes and pedimental groups. The text gives an account of the subjects represented, and stresses the intimate connection between the sculpture and the building for which it was designed. In his final section, the author concurs with the long-established opinion that to Pheidias must be assigned 'the major share of the credit for the sculpture of the Parthenon'.

AUTOMATION TO-DAY AND TOMORROW. *A Technical Survey of Current Progress. By L. Landon Goodman. London, Iota Services Ltd.*, 1959. 40*s net*

Describing his book, the author writes, 'In it I give an indication of the field of automation and some of its important aspects; examine its present developments and its future trends; and show that its application is not confined to mass production. There follows an extensive bibliography. . . .' This classified bibliography occupies 143 pages, and should prove a valuable guide to literature on this subject for a long while to come.

FROM THE JOURNAL OF 1860

VOLUME VIII. 16*th March*

GRANITE AND LILIES

From a paper on 'The Art Treatment of Granitic Surfaces', read by John Bell, the sculptor, on 14*th March.*

Being interested in the subject of public drinking fountains in London . . . I conceived that . . . it might be desirable not only to decorate these, but to do so simply, and in a method that would not be liable readily to injury. . . .

In accordance also with the impression that in all cases, when possible, decoration should tell some true tale, and be in accordance with the object with which it is associated, I conceived naturally that among others, nothing would be more readily pleasing for these objects than a floral treatment, namely of water plants, of which we have been considering such fine results in the art of the Egyptians. And in this respect, in the way of art suggestion, it is pleasant to know that our Flora is quite as graceful as that of any other country; old England being quite as fruitful in such suitable natural types as old Egypt. There are our beautiful ferns, with their feather-like fronds, easily traced on the granite or marble, so many of which delight in the margins of pure water. There is the Phyllitis, or hart's tongue fern, either the plain or the fingered, which loves to hang from rocks which distil fair water, 'Les rochers qui pleurent', as the French have it—the rocks which weep.

Then there is our well-loved forget-me-not, the *Myosotis palustris*, which delights in the sides of brooks. This, however, cannot be said of the iris, *fleur de luce*, or wild flag, which loves the shade of willows.

Of all the British plants, however, of which the names even as casually repeated, transport us, in imagination, to charming country haunts, none are so inviting, perhaps, for the present purpose as the beautiful white and yellow water-lilies of our

waters—the *Nymphæa Alba*, or white nymph, and the *Nymphæa Lutea*, the yellow or golden lily.

Oh, Thames of many waters!
See on thy placid breast reclines
The fairest of thy petalled daughters,
That pure white nymph that buds and binds,
In raft-like forms, her flowers and leaves,
In flakes upon her glassy bed;
And with her gold-haired sister weaves
A chaplet for thy head. . . .

Did we, in the kingdom of the lilies, wish to go further a-field, among the beautiful varieties of their class which Nature affords us, we shall find, perhaps none more beautiful, nor certainly any one so magnificent as Euryale Amazonica, or *Victoria Regia*, of the river Amazon, which in that river flourishes to that degree that its leaves are 5 feet across, and a child can stand firmly and safely on one of them while floating on the water. In one stage of its perfection the noble flower of this plant, more than a foot across, assumes a most exquisite and almost unprecedented floral form of the highest ornamental character. This takes place in its transition from bud to blossom, as indicated here; and when only half the leaves are open and retroverted, the inner ones retaining the form of a bud. It is then bud and blossom all in one. As this plant has now become comparatively familiar in the gardens at Chatsworth, Kew, and the Crystal Palace at Sydenham, many of those present may probably have seen the flower in this stage.

Some Activities of Other Societies and Organizations

WED. 2 MAR. Analytical Chemistry, Society for, at Queen's Hotel, Stephenson Place, Birmingham 2. 4.30 p.m. Professor A. C. Frazer: *The contribution of analytical chemistry to medical progress.*

British Academy, Burlington Gardens, W.1. 5 p.m. Professor E. Wind: *Michaelangelo's prophets and Sibyls.*

Engineering Designers, Institute of, at Queen's Hotel, Birmingham. 7 p.m. C. C. Morgan: *Plastics in industry.*

Petroleum, Institute of, 61 New Cavendish Street, W.1. 5.30 p.m. Michael Estavoyer: *Corrosion problems in the Lacq field.*

Victoria & Albert Museum, South Kensington, S.W.7. Professor C. H. J. Gombrich: *Expression and communication.*

THURS. 3 MAR. Civil Engineers, Institution of, Great George Street, S.W.1. 5.30 p.m. Sir Hugh Beaver: *The engineer and civilization.*

Radio Engineers, British Institution of, at College of Technology, Sackville Street, Manchester. 6.30 p.m. M. J. Tucker: *Electronics in oceanography.*

Royal Society, Burlington House, W.1. 10.30 a.m. Professor F. Hoyle: *Problems of stellar evolution.*

FRI. 4 MAR. Engineers, Junior Institution of, Pepys House, 14 Rochester Row, S.W.1. 7 p.m. Rex Wailes: *Windmills in colour.*

Radio Engineers, British Institution of, at North Gloucestershire Technical College, Cheltenham. 7 p.m. K. Fearnside: *The use of radio aids in the control of modern transport aircraft.*

SAT. 5 MAR. British Interplanetary Society, at Caxton Hall, S.W.1. 2.30 p.m. Patrick Moore; K. W. Gatland; W. N. Neat: *The exploration of the Moon.*

MON. 7 MAR. Engineers, Society of, at Geological Society, Burlington House, W.1. 5 p.m. R. Lenoir: *The progress of British watch and clock production.*

TUES. 8 MAR. Radio Engineers, British Institution of, at Matthew Boulton Technical College, Birmingham. 7.15 p.m. F. Butler: *Transistor power amplifiers.*

WED. 9 MAR. Royal Archaeological Institute of Great Britain and Ireland, at Burlington House, W.1. 5 p.m. Oliver Millar: *A re-assessment of Charles I's patronage of Van Dyck.*

WED/THURS. 9/10 MAR. University of London, Gower Street, W.C.1. 5 p.m. Professor A. H. Steiner: *Civic architecture—Swiss conditions and buildings.*

THURS. 10 MAR. Physical Society Acoustics Group, Imperial College, Imperial Institute Road, S.W.7. 5.30 p.m. Dr. J. M. Bowsher: *Electronic music.*

Royal Society, Burlington House, W.1. 4.30 p.m. Dr. A. L. Hales: *Bernard Price's Institute of Geophysical Research.*

FRI. 11 MAR. Engineers, Junior Institution of, Pepys House, 14 Rochester Row, S.W.1. 7 p.m. D. W. Higham: *Refrigeration at sea.*

At Pepys House, 14 Rochester Row, S.W.1. 7 p.m. J. M. J. Estevez: *Application uses and limitations of modern plastic materials in engineering.*

WED. 10 MAR. Engineering Inspection, Institute of, at Royal Society of Arts. 6.15 p.m. Frank Nixon: *Fatigue testing as a corollary to non-destructive testing.*

Victoria & Albert Museum, South Kensington, S.W.1. Eric Newton: *The creative process.*

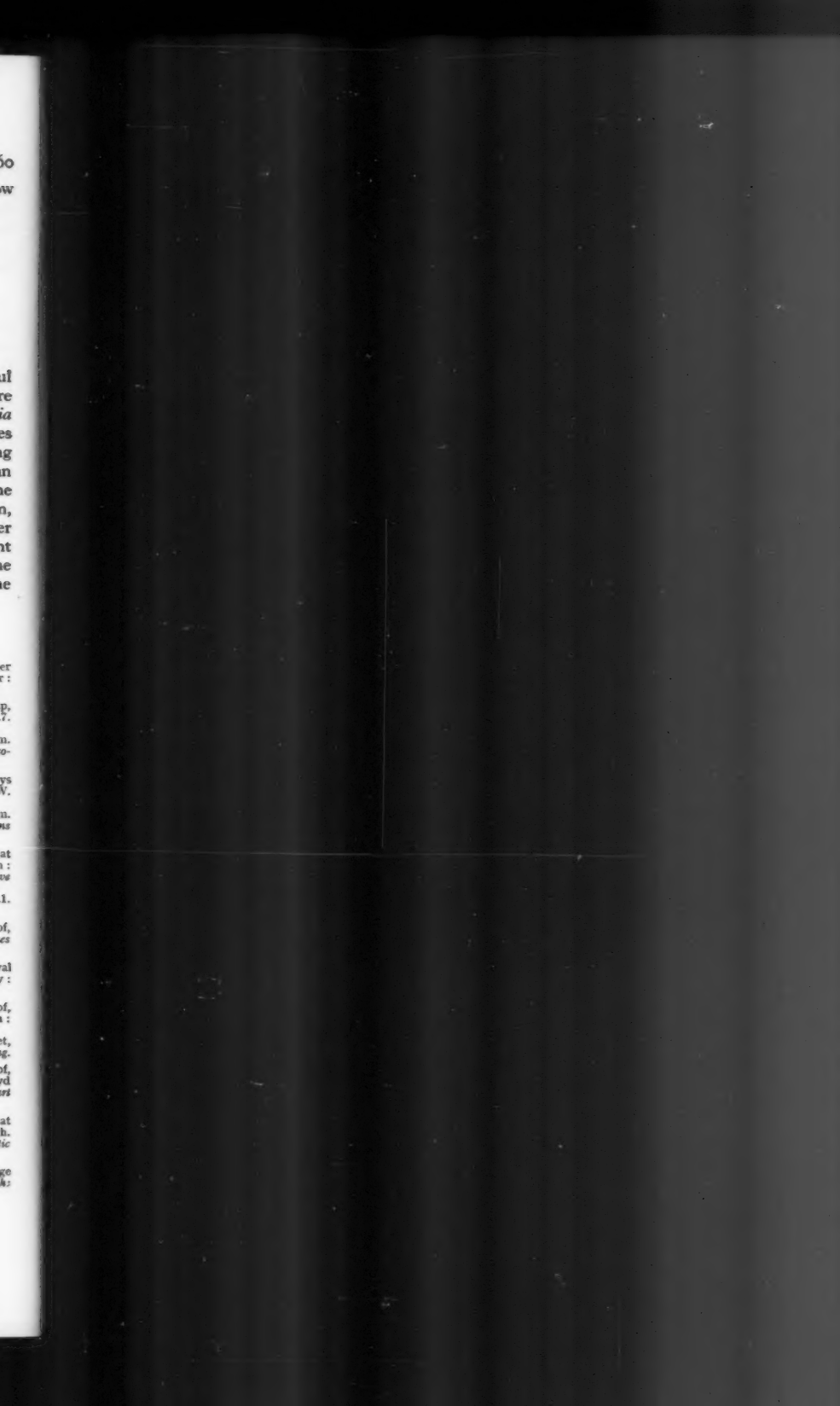
FRI. 18 MAR. Analytical Chemistry, Society of, 14 Belgrave Square, S.W.1. 6.30 p.m. *Techniques of automatic analysis.*

MON. 21 MAR. Engineers, Junior Institution of, at Royal Victoria Hotel. 7.30 p.m. Professor J. M. Kay: *The engineer's rôle in nuclear power.*

TUES. 22 MAR. British Architects, Royal Institute of, 66 Portland Place, W.1. 6 p.m. Peter Trench: *Thinking ahead about the building industry.*

Civil Engineers, Institution of, Great George Street, S.W.1. 5.30 p.m. R. Beeching: *Plastics in engineering.*

THURS. 24 MAR. Radio Engineers, British Institution of, 9 Bedford Square, W.C.1. 6.30 p.m. Dr. I. Boyd and W. R. Eadie: *The continuous recording of heart activity.*

FRI. 25 MAR. Radio Engineers, British Institution of, at The University, Drummond Street, Edinburgh. 7 p.m. J. Shayler: *Radio guidance in the automatic landing of aircraft.*

TUES. 5 APR. Civil Engineers, Institution of, Great George Street, S.W.1. 5.30 p.m. C. B. Townend: *The economics of waste water treatment.*